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Cultural Resources Overview

Middle Rio Grande Valley, New Mexico

Dr. Linda S. Cordell



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A CULTURAL RESOURCES OVERVIEW OF THE MIDDLE
RIO GRANDE VALLEY, NEW MEXICO

By Linda S. Cordell

For

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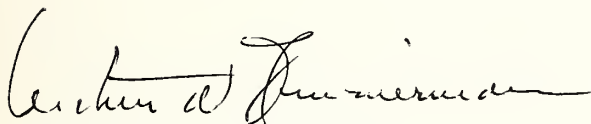
PREFACE

We are always pleased to see a useful and innovative project come to fruition. About two years ago we conceived the idea of working jointly in areas where our developing cultural resource programs could mutually profit. Both agencies have a need for cultural resources information which will be useful in our planning processes. Out of these considerations, we made a decision to jointly produce a series of Cultural Resource Overviews for the State of New Mexico.

This document is the first in the series and, we feel, represents a landmark publication for both land managers and archeologists. While designed as a baseline document for input into National Forest and Bureau of Land Management

planning efforts, the content is such that archeologists should also find this volume useful. We feel particularly fortunate in having secured the services of Dr. Linda Cordell for the writing of this overview. Her specialized knowledge of the area, conscientious work habits, and positive professional attitude toward the project have been the real contributors to its success.

We trust that our continuing joint efforts in cultural resources management will benefit not only the agencies but the resource itself. The users of the resource, the American people, stand to gain a greater understanding of past human behavior and what that may teach us about ourselves and the future.



ARTHUR W. ZIMMERMAN
State Director
USDI Bureau of Land Management
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M.J. HASSELL
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Dee F. Green and Leo L. Flynn are, of course, responsible for the coordination of the project as a whole, but beyond that each has provided considerable encouragement and consistently helpful advice. Donna Calkins typed the manuscript.

I am sincerely grateful to all of those mentioned, and, of course, I take full responsibility for the content of this document, its lapses and shortcomings.

Albuquerque, July 23, 1978
Linda S. Cordell

INTRODUCTION

The purpose of this study is to provide a detailed synthesis of known cultural resources in a portion of New Mexico. The study area (Map 1) has been defined by the Forest Service, Southwestern Region and the Bureau of Land Management, Santa Fe, for which this overview was prepared. It comprises most of the Rio Grande drainage from Albuquerque north to the Colorado State line. The study began on January 1, 1978, and was completed on July 31, 1978. During the first three months, a search of available literature was conducted. Materials were obtained from the Zimmerman Library at the University of New Mexico, Albuquerque; the Laboratory of Anthropology, of the Museum of New Mexico, Santa Fe; Fort Burgwin Research Center, Taos; the Kit Carson Foundation, Taos; the Office of Contract Archeology, University of New Mexico; the Regional Office of the Forest Service, Albuquerque; the Albuquerque Office of the Bureau of Land Management; the Carson National Forest, Taos; The School of American Research, Santa Fe; and the Clark Field Archive of the Department of Anthropology, University of New Mexico (see Appendix 1). The report was written and graphics prepared over the next four months (see Appendix 2).

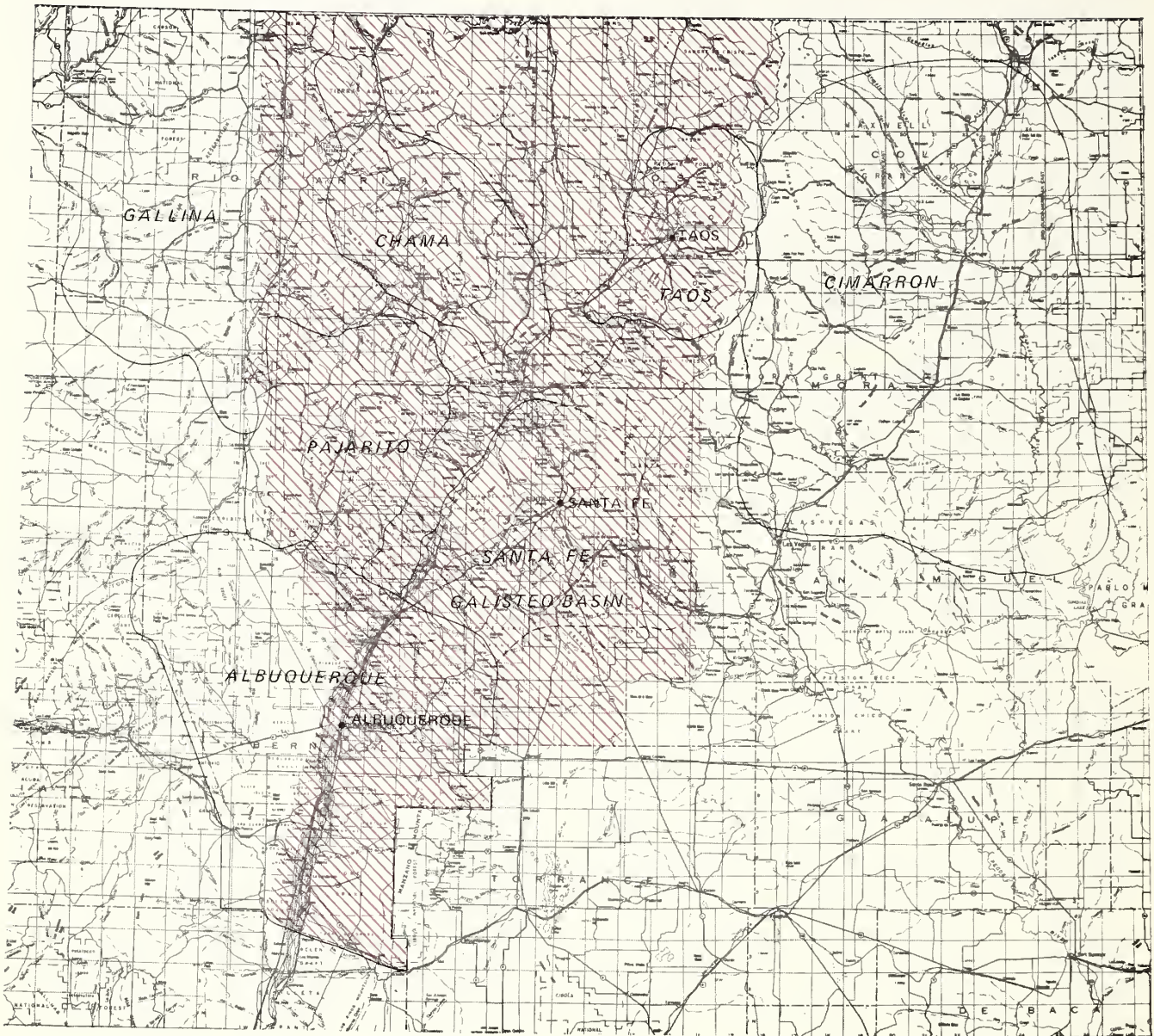
The report is addressed primarily to professional archeologists working in the field of cultural resource management. It is intended to provide an evaluation of what and how much is known about the cultural resources within the study area in order that the significance of these resources may be evaluated in the light of present understanding. Archeological research is currently in a state of transition in which priorities are being re-evaluated. It is to be expected that as research interests change, management strategies will be re-evaluated continuously. Future research directions will, in large part, develop from the concerns of management agencies. There are two reasons for this. First, most of the cultural resources which are available for study are, and will continue to be, on public land, especially in the West. Second, only the agencies which administer public lands have the financial, personnel and technical resources to pursue holistic, integrated, and long-term research designs.

STRENGTHS AND WEAKNESSES OF THE DOCUMENTS

Both casual exploration and intensive research have been conducted in the study area for nearly 100 years. Known archeological sites number in the thousands. The data on which this report is based are of variable reliability and quality. Some areas have been surveyed for cultural resources, but others have not. Surveys have consisted of noting interesting ruins from automobiles or airplanes to complete coverage, on foot, and recording all isolated artifacts and sites within designated areas. Excavation has varied from limited testing of sites to complete excavation. Data recovery techniques used in excavation are equally variable. In some cases, no vertical or horizontal controls were maintained nor was fill screened. In other cases both natural and arbitrary levels were mapped, all fill was screened and various samples (soil, pollen, flotation, etc.) were taken. Although expectable in view of the length of time over which investigation has been carried out and the dramatic changes in archeology during that time, there are still no survey and excavation standards that are met consistently. The descriptive body of this report reflects the problems of non-comparability of investigation and data recovery. It is an overview of what has been documented and of the observations which scholars believed were important to make.

In a real sense, the report is an overview of the field of archeology in the study area as reflected in the literature. Unfortunately, therefore, this study cannot and does not address some issues which are of importance both to current research and management. For example, there is more information on details of architecture and ceramics than there is on the distribution of types of sites with respect to various landforms. On the other hand, the emphasis on the available literature must be considered an important beginning, because no other synthesis of this material exists and many of the site reports and survey reports, although available in various archives and files, are not in published form. With the vast quantity of reports, notes, articles and monographs on the study area, a guide to what is available

PUEBLOAN ARCHEOLOGICAL DISTRICTS



STUDY AREA

Map 1.

and what is not, what has been learned and what has not, is essential. My hope is that, at a minimum, this report constitutes such a reference.

There are additional limitations in this report which reflect both the condition of various records and files as well as my abilities. Although the overview provides a synthesis of the literature, not every site in the study area for which there is information has been included. Data, such as minimal site descriptions, and in some cases, unanalyzed excavation notes exist for many sites, but the time available for preparation of this document precluded the possibility of an attempt to organize and synthesize this information. Computerized files which contain limited descriptive survey and site data are available at some institutions and agencies but not at others. In most cases, these files currently are being established, and at present contain information which are of variable quality and comprehensiveness. No attempt was made to incorporate this material, because there was not enough time for me to determine the reliability or comparability of the records. Generalizations based on computer files which are in preliminary states of preparation are likely to be in error. Because the agencies plan additional and more comprehensive overviews of states and regions, I have assumed that records and computer files will be in a more suitable condition in the future allowing for study and inclusion when subsequent reports are written.

The section on historic resources probably is the weakest part of this report, reflecting my lack of training and experience with archival and ethnohistoric documents. Also, although I have attempted to bring my knowledge of prehistoric archeology to the evaluation of all material included here, I have had no first hand experience with PaleoIndian or Archaic archeology. The reader probably will find my descriptions of geologic structure, landforms, fauna and flora to be very basic, but this will not handicap resource managers whose work in specific localities provide a far better understanding of these features. Additionally, there has been insufficient time for me to examine artifact collections from the study area. In the body of this report, I use descriptions from the literature. In several places, I suggest that the degree of variability exhibited among artifact types in several classes should be

determined, and I hope that this will be accomplished in the future.

CHANGING GOALS OF INVESTIGATION 1890-1978

Between about 1890 and 1915, investigations were directed toward discovery of the kinds of ruins existing in the study area. Attention was focused on documenting the large habitation sites and noting their most salient physical characteristics. These inquiries were largely exploratory in nature. The United States, in 1848, had come into possession of a vast amount of land and the first concern was to discover the resources in this territory. It is important that documents written during this exploratory period are still classics which are cited in the current literature. Thus, Bailey's (1913) study of life zones in New Mexico is still used as a guide to fauna and flora. Hewett's (1906) survey of the archeological resources of the Pajarito Plateau has not been superseded by a document of similar scope. Nelson's (1914) work in the Galisteo Basin remains the most comprehensive guide to the ruins of that area. Although the early workers wrote accounts which are biased toward the larger ruins, often only the most impressive of which are described, these people, because they brought a variety of experiences and observation to their work and had travelled the country extensively, made observations of regional differences which are still important. In fact, until today, the works of the earliest scholars are probably the most comprehensive in viewing the study area within the context of Southwestern and North American archeology as a whole. The workers of this period also had considerable contact with and interest in contemporary Indian populations, and the distinctions between "prehistoric" and "historic" archeology were not considered important. For these reasons, many insights of the first investigators are closer to modern concerns than those characteristic of the intervening years.

From about 1915, and continuing today, the major research emphasis in the study area has been with 1) establishing chronological relationships and 2) determining the "cultural affiliations" of various peoples whose ruins were investigated. Chronologies have been derived in several different ways. The first schemes, based on

excavation and survey, were "developmental" (Kidder 1924; Roberts 1936b). Methods of chronometric dating were unavailable. Evolutionary theory of the time assumed a progression from simple to more complex forms. Therefore, in developmental schemes, the crudest artifacts or type of sites were generally considered oldest and more sophisticated items were ranked in serial progression. The literature of the study area still contains the biases of developmental thinking at all levels. Thus, pithouses are "cruder" than above ground masonry pueblos and should therefore be older. The fact that pithouses were used in some portions of the area until relatively recent times is viewed as a problem of "lag" or marginality. Again, prior to the availability of specific dating techniques, developmental schemes were also derived through the application of the direct historical approach, or working backward from the known. Kroeber's (1916) study of Zuni potsherds is a classic study of this sort, and it is not surprising that analyses of ceramics (items which do show considerable variability) figure most prominently in these schemes. Although subsequent research has verified the importance of ceramic types as frequently good chronological markers, researchers in the study area have tended to view variability in ceramics only with reference to the temporal dimension. When types (such as Gallina B/w or Taos B/w) are found which remain stable through time, "lag" or "isolation" are invoked as explanatory devices. Further, unlike other areas of the Southwest, researchers in the Rio Grande have continued to interpret ceramic types as univariate phenomena. With a few exceptions, ceramic attributes have not been considered separately, as potential sources of information on various aspects of behavior.

With the advent of tree-ring dating, research became almost exclusively concerned with developing refined local chronologies. This work continues, and it is interesting that despite the emphasis on time frameworks and the ease with which tree-ring specimens may be processed, there are areas within the boundaries of the study region which are inadequately dated. There seem to be two major reasons for this lapse. First, the amount of work in the study area, until the recent revolution engendered by contract and public archeology, has been conditioned by

the varying interests of a few archeologists. No research institution has maintained a consistent long-term focus and program of Rio Grande archeology. Second, tree-ring chronologies and ceramic cross dating, largely developed in the San Juan and elsewhere, have been assumed to provide reliable chronological control for the Rio Grande. This assumption currently is being questioned, but no major revision in thinking is yet reflected in most reports.

Attempts to determine the "cultural affiliation" of types of artifacts and of sites have been conducted on varying levels of specificity. In some cases only the broadest categories, such as Plains or Southwest or Mogollon or Anasazi, have been considered relevant. In other studies, the ancestral communities of various modern Rio Grande Pueblos have been sought. Research emphasis on the specification of the linguistic affiliation of people known through archeological materials is a continuing interest. Whether concerned with broader or narrower affinities the scale of observation has been specific artifact types (such as elbow pipes, cylindrical beads or snub-nose end scrapers), attributes of artifacts or architectural features (such as jars with pointed bottoms, pots finished by scraping, or pithouses with ramp entryways). The appropriateness of the scale of observation to the level of problem interest has not been questioned.

Since about 1970 the range of problems addressed in the study area has broadened. A few surveys have been oriented toward defining patterned relationships among types of sites and configurations of land forms and natural resources. Some investigators have experimented with survey design and have included observations about distributions of single artifacts as providing relevant information about past behavior (in addition to observations of habitation and special use sites). Recent excavations have involved attempts to monitor changes in artifact classes as these relate to activities, and most research recently has attempted, one way or another, to consider paleoenvironmental information and human adaptation. In most cases; however, inquiries have been "grafted on" to traditional ways of viewing site and artifact variability in terms of chronological and/or cultural markers. Few issues of method have been raised.

Readers of this report should realize that it contains both inferences made by other investigators as well as my own interpretations. All inferences derived from the literature are followed by citation references. My own comments range from generally conservative statements to those of a more speculative nature. In each case, I have prefaced remarks with phrases such as "in my opinion" or "I think" or "I believe" or "it is my judgment that." Although this approach may distract somewhat from the flow of narrative, I want to draw attention to the fact that these observations are my own and should not be taken as generally accepted by all archeologists working in the study area. I hope that readers will evaluate my remarks critically.

PHYSICAL ENVIRONMENT OF THE STUDY AREA

The study area includes portions of the Southern Rocky Mountains (the Sangre de Cristos, the Brazos uplift, and the Jemez Mountains), the Rio Grande Rift, and the Chama Basin, which is part of the Colorado Plateau (Woodward 1974; Thornbury 1965). Although the Sangre de Cristos are the frontal range in New Mexico, geologically they belong to the granite belt of western Southern Rocky Ranges. Most of the Sangre de Cristos consist of complexly faulted sedimentary rocks and a core of Precambrian schists, gneisses, pegmatite and local bodies of granite and diorite. The mountains were formed during the Laramide Orogeny of the Late Cretaceous and early Tertiary (Thornbury 1965:343; Woodward 1974); they were glaciated during portions of the Pleistocene, and numerous rock streams were formed either then or in recent times (Powell 1958; Thornbury 1965:343). The Brazos uplift trends northwesterly and extends into Colorado. That part in New Mexico is about 50 miles long and up to 25 miles wide. It consists of a core of Precambrian rock overlain by a thin veneer of Tertiary volcanic and continental clastic rocks (Woodward 1974). The Jemez Mountains were formed after initial development of the Rio Grande Rift and continued to build contemporaneously with later stages of rifting. The Jemez are comprised of a complex pile of volcanic rocks. The earlier eruptions were of basalt, followed by extrusions of andesite, quartz

latite, rhyolite and rhyolitic ash flows. The Toledo and Valles calderas are the major structures of the Jemez and were formed by collapse after extrusion of the Bandelier Tuff (Trainer 1974; Woodward 1974).

The Rio Grande Rift, a late Cenozoic feature, was superimposed on the Laramide structures. It is comprised of a series of north-northeasterly trending grabens, referred to as basins. Within the study area, the basins are, from north to south, a portion of the San Luis Basin (which extends into Colorado), the Espanola Basin, the Santo Domingo and Albuquerque Basins. The San Luis Basin is comprised largely of volcanic rocks, whereas the Espanola, Santo Domingo and Albuquerque Basins are composed primarily of sedimentary rocks of the Rio Grande Rift (Woodward 1974). The Pajarito Plateau, which slopes gently eastward from the Jemez Mountains toward the Rio Grande where it terminates in steep slopes and cliffs caused by downcutting of the river is comprised of "an apron" of volcanic rocks from the Jemez Mountains (Woodward 1974; Purtyman and Johansen 1974). The Chama Basin structurally is part of the Colorado Plateau. Within it, the principal structure is the broad, north-trending Chama syncline which runs from the Brazos uplift north of Tierra Amarilla to the Jemez volcanics between Coyote and Abiquiu. The major rocks of the Chama Basin are sedimentary (Woodward 1974).

The most important river within the study area is the Rio Grande, which enters the San Luis Valley near Del Norte, Colorado and continues south-southwest. The Rio Grande and its tributaries carry a considerable amount of silt and alluvial debris (Powell 1958; Thornbury 1965:343). The principal tributaries of the Rio Grande within the study area are the Red River, Taos Creek, Embudo Creek, Rio Santa Cruz, Rio Pojoaque, Rio Santa Fe, Rio Galisteo, all on the east, and the Rio Chama and Rio Jemez on the west (Harper, Cordova and Oberg 1943).

The climate within the study area (discussed in more detail on pp. 145-150), is generally considered to be semi-arid. The mountainous areas and other high elevations receive more precipitation than the lower lying basins. Mean annual precipitation at Santa Fe is about 14 inches, and at

Albuquerque about 9 inches. About half the precipitation occurs as winter snowstorms. The remainder consists of summer thunder storms which also account for 50% of the runoff (Hunt 1967:253). There is a close negative correlation between elevation and frost-free period.

Vegetation is zoned in response to altitudinal changes in climate, although exposure, degree of slope, soil composition and depth of soil modify the zonal configuration. In general, the basins, river valleys and mountain slopes up to about 7,000 feet lie within the Upper Sonoran Life Zone. Riparian communities exist near perennial water, and shorter grasses and more xeric shrubs are found away from major streams and water sources. Above the Upper Sonoran Life Zone plants characteristic of the Transition Zone occur and above these, plants of the Canadian and Hudsonian Zones. In general, timberline occurs at about 11,000 feet. Several studies of vegetation patterning done in conjunction with archeological research, are available, including those of Witter (1975), Tierney and Jones (1977), Dickson (1975), and Drager and Loose (1977). The latter study, based on several ethnobotanical reports, indicates that the Upper Sonoran and Transition Zones contain 35 and 30 edible plant species, respectively. The Canadian and Hudsonian Zones have only 7 and 3 edible plant species (Drager and Loose 1977:38).

A variety of faunal resources occur within the study area. Some, such as cottontail rabbits and jackrabbits are virtually ubiquitous, their distributions depending on type of ground cover (Cordell 1977). Larger game animals, such as elk, mule deer, and bighorn sheep are found at higher elevations. Mule deer may be found at any elevation but when concentrated in numbers tend to be within the Transition Zone. Antelope occur at various elevations where there is a suitable abundance of grassland (Findley et al. 1975; Cordell 1977a). The region supports a diverse avifauna, with migratory waterfowl present in winter along the rivers and at playas.

In a productive, though general way, the study area may be compared to other parts of New Mexico by visual inspection of Maps 2, 3, and 4 (in Map Pocket). Map 2 indicates Effective Temperature values in the area and elsewhere in New Mexico.

Effective Temperature is a standardized measure of annual temperature, computed from the following formula:

$$ET = \frac{(18 \text{ X of WMC}^\circ) - 10 \div (\text{X of CMC}^\circ)}{(\text{X of WMC}^\circ - \text{X of CMC}^\circ) + 8}$$

Where WMC°=warmest month in degrees centigrade

CMC°=coldest month in degrees centigrade

Any measure of annual temperature provides only one dimension along which distributions of plant and animal populations may be viewed. Nevertheless, the study area contrasts with other portions of New Mexico in being relatively cooler on a year round basis. Preliminary implications derived from this observation include the suggestion that many of the larger fauna (deer, elk, mountain sheep) were probably more abundant in the area than elsewhere in New Mexico; that two agricultural crops per year are not possible; the growing season for one crop in any year may be inadequate; and aboriginal housing during winter may reflect design for heat retention. A final observation which can be made by inspection of Map 2 is that the study area shows a rough bipartite division with respect to annual temperature. The area from Albuquerque north to about Espanola is both warmer and less variable with respect to annual temperature than the area from Espanola north. Recent research (Lewis R. Binford, personal communication 1977) on patterning of cultural adaptations of hunters and gatherers in relationship to Effective Temperature on a global basis has indicated that food storage correlates with Effective Temperatures of 15 and below, and that population densities are highest in areas of Effective Temperatures between about 14 and 18. The latter relationship includes an observation that the increase in population densities will also be more marked as rainfall decreases or becomes more erratic. The implications are that populations of hunters and gatherers should have grown more rapidly in areas of New Mexico outside the study area, and that if the adoption of agriculture is conditioned to some extent by demographic pressure, the study area should have lagged behind other parts of New Mexico in using cultigens.

Map 3 shows the distribution of average number of days of the growing season,

measured from first to last killing frost, for the state of New Mexico. Since a minimum of 120 days is required for corn, it is obvious that several small localities within the study area are not suitable for this crop today. On the other hand, much of the Rio Grande Valley proper is, at least marginally, suitable for corn horticulture. Local variability in the length of the growing season is marked. The Map of growing season does not evidence the bipartite division observed in the effective temperature map, which indicates that winter temperature is more extreme north of Espanola, except in the high mountainous areas. One might therefore expect cultural adaptations which would serve to moderate relatively cold winters to appear north of Espanola. These might include more consistent selection of exposure and orientation of surface dwellings and increased depth of pithouses. The map indicates that the greatest variability in growing season within the shortest distance occurs along the west slopes of the Sangre de Cristos. One would expect that wild plant foods would mature and be available sequentially in this area, and for that reason it would be attractive for gathering activities.

Map 4 displays average annual precipitation for New Mexico from 1931 to 1952, measured in inches. Although average precipitation, like average length of growing season, may be misleading due to the variability from one year to another, the map indicates that the study area is relatively well-watered compared to many other parts of the state. This observation, combined with the Effective Temperature figure of less than 14, indicates that relatively lower densities of hunters and gatherers would have existed in the area compared to the regions immediately around it. Further, agriculture, once adopted, would have been relatively more secure than in other parts of New Mexico, although portions of the study area would be unable to support horticultural economies at all because of the short growing season.

In sum, very general and basic climatological data indicate that compared to other portions of New Mexico, particularly the San Juan basin, the study area provides more abundant habitats for game animals, more diverse vegetation, including edible plants, moisture regimes which are generally favorable for horticulture and a situation in which there is relatively close proximity of areas which would have been appropriate for crops to those which could not be used for cultivation but would support diverse and abundant plant and animal species. This situation is ideally suited to a human adaptation involving a mixed subsistence base with horticulture, where practicable, supplemented by wild food resources.

Both archeological and ethnographic data indicate the importance of wild plant and animal foods in the study area. The archeological data are presented, by appropriate time period, in the next chapter. Table 1 provides a list of wild plant foods used by the ethnographically known Rio Grande Pueblos. Hunting among the modern Rio Grande Pueblos has not been of major importance since the introduction of European domestic livestock, however its past importance is reflected in contemporary ritual (Ortiz 1969) and in the archeological record (Cordell 1977a). Game taken by the Rio Grande Pueblos included small animals (such as rabbits and rodents), deer, elk, mountain sheep, pronghorn, and bison. Small birds, and waterfowl are represented in late prehistoric archeological assemblages (Cordell 1977a).

Evaluation of paleoenvironmental reconstructions are presented within the context of the cultural narrative. Detailed discussions and graphic representations of variability in rainfall and growing season within the study area are presented on pp. 67 to 99, of the narrative.

Table 1 Wild Plants Used as Food by the Rio Grande Pueblos*

Latin Name	Common Name	Plant Part or use**	Storable	Emergency Food
<i>Amaranthus graecizans</i>	pigweed, amaranth	P	X	
<i>Amaranthus retroflexus</i>	pigweed, amaranth	P	X	
<i>Cleome serrulata</i>	Rocky Mountain beeplant	S,P	X	
<i>Portulaca oleracea</i>	common purslane	P	X S,P	
<i>Rumex crispus</i>	curly dock, sour dock	P		
<i>Taraxacum officinale</i>	common dandelion	P(y)		
<i>Pinus edulis</i>	pinon pine	S,P	X	
<i>Yucca baccata</i>	yucca, datil, soapweed, broad-leaved yucca	f	X f	f
<i>Yucca glauca</i>	yucca, soapweed, amole, narrow-leaved yucca	S,P,f	X	
<i>Helianthus annuus</i>	sunflower	S	X	
<i>Allium recurvatum</i>	wild onion	r		
<i>Chenopodium leptophyllum</i>	narrow-leaved lambsquarter	P(y)		
<i>Chenopodium album</i>	lambsquarter	P(y)		
<i>Amelanchier prunifolia</i>	serviceberry	f		
<i>Asclepias galioides</i>	milkweed	P,r		
<i>Astragalus diphysus</i>	milkweed	P		
<i>Koeleria cristata</i>	June grass	S		
<i>Nolina microcarpa</i>	bear grass	S,P		
<i>Chenopodium</i>	lambsquarter	S		
<i>Atriplex argentea</i>	saltbush	P		
<i>Atriplex cornuta</i>	saltbush	P		
<i>Atriplex philonitra</i>	saltbush	P		
<i>Berberis haematocarpa</i>	redberry, algerita berry	f		
<i>Berberis fendleri</i>	barberry	f		
<i>Bossekia parviflora</i>	thimbleberry	f		
<i>Celtis reticulata</i>	hackberry, paloduro	f	X	
<i>Celtis douglasii</i>	hackberry	f		
<i>Vicia americana</i>	vetch	P,S		
<i>Ciatris punctata</i>	glazing star	r		
<i>Petalostemon oligophyllus</i>	prairie clover	r		
<i>Cycoperdon</i>	puffballs	P	X	
<i>Polyporus halowii</i>	bracket fungus	P	X	
<i>Fomes</i>	kutokani	P		
<i>Mimulus geyseri</i>	monkey-flower	P		
<i>Monarda Menthaefolia</i>	horsemint, oregano, bee-balm	P		
<i>Chrysothamnus conifis</i>	rabbit brush	P(buds)		
<i>Polanisia trachysperma</i>	clammy weed	P(y)		
<i>Stanleyella wrightii</i>	desert plume	P(y)		
<i>Sophia sophia</i>		P(y)		
<i>Sophia halictorum</i>	tansy mustard	P(y)		
<i>Echinocereus</i>	spiny hedgehog	P,f		
<i>triglochidiatus</i>	cactus			
<i>Echinocereus fendleri</i>	hedgehog cactus	P,f	X	
<i>Echinocereus gonocanthus</i>	hedgehog cactus	P,f		
<i>Equisetum laevigatum</i>	smooth scouring rush, horsetail	P		
<i>Fragaria bracteata</i>	strawberry	f		
<i>Habenaria sparsiflora</i>	bog orchid	P,r,f		e
<i>Holodiscus dumosus</i>	ocean spray, rock spiraea	f		

Table 1 (continued)

Latin Name	Common Name	Plant Part or use	Storable	Emergency Food
<i>Juglans major</i>	walnut	S	X	
<i>Juniperus monosperma</i>	one seeded juniper	S, f	X	
	Rocky Mountain juniper			
<i>Juniperus pachyphloea</i>	alligator juniper	f	X	
<i>Lathyrus decaphyllus</i>	wild pea, peavine	f		
<i>Populus wislizeni</i>	valley cottonwood	P		
<i>Portulaca retusa</i>		P		
<i>Prosopis glandulosa</i>	mesquite	S		
<i>Strombocarpa pubescens</i>	screw bean tornillo	P	X	
<i>Prunus americana</i>	wild plum	f		
<i>Pseudocymopterus</i>		P		
<i>aletifolius</i>				
<i>Ptelea tomentosa</i>	wafer ash	f		
<i>Quercus utahensis</i>	oak	S		
<i>Quercus gambelii</i>	oak	S	X	
<i>Pectis papposa</i>	fetid marigold	P, r, f	X	
<i>Phellopterus bulbosus</i>	wild celery			
<i>Physalis neo-mexicana</i>	ground-cherry	P, r, f	X	
<i>Physalis longifolia</i>	ground cherry	P, r, f	X	
<i>Pinus scopulorum</i>	rock pine,	S, P		e
	western yellow pine	inner bark		
<i>Rudbeckia laciniata</i>	cone flower	P, r		
<i>Rumex venosus</i>	dock, sorrel	P		
<i>Rumex mexicanus</i>	Mexican dock	P		
<i>Smilacina amplexicaulus</i>	Solomon's seal	f		
<i>Solanum elaeagnifolium</i>	bull nettle silver	r, f		
	prickly nightshade			
<i>Solanum fendleri</i>	wild potato	r(tuber)		
<i>Solanum jamesii</i>	wild potato	r(tuber)	X	
<i>Hoffman seggia densiflora</i>	Indian potato	r(tuber)		
<i>Vitis arizonica</i>	wild grape	f, P, r	X	
<i>Opuntia arborescens</i>	chollas, cane cactus	P	X	
<i>Opuntia clavata</i>		f		
<i>Opuntia polyacantha</i>		f		
<i>Opuntia engelmannii</i>	prickly pear cactus	P, f	X	
<i>Opuntia camanchica</i>	prickly pear cactus	f		
<i>Mammillaria</i>	pincushion, ball cactus			
<i>Ribes inerme</i>	gooseberry	f		
<i>Ribes leptanthum</i>	gooseberry	f		
<i>Robinia neo-mexicana</i>	New Mexico locust	P(flowers)		

* Sources: Harrington (1967); Castetter (1935; Harrington (1916); White (1944)

** P=Potherb or green, S=Seed or nut, r=Root or bulb, f=Fruit or berry,
(y)= (young plant)

THE PALEOINDIAN PERIOD

INTRODUCTION

This portion of the report provides a summary of the culture history of the study area. It is divided into five chapters: PaleoIndian, Archaic, Later Anasazi Prehistory, Southern Athabaskan, and Historic Period. The chapters refer specifically to chronological periods. Thus although the terms PaleoIndian and Archaic are frequently employed as references to kinds of subsistence adaptations (viz. big game hunting and broad spectrum hunting and gathering with the later addition of limited horticulture), the terms as used here will refer only to the chronological positions generally assigned to these manifestations. PaleoIndian therefore refers to artifactual remains dating from the late Pleistocene (ca B.C. 9500 to ca. B.C. 5500), and Archaic to remains dating from ca. B.C. 5500 to A.D. 400. The section on Later Prehistory covers archeological materials dating from ca. A.D. 400 to ca. A.D. 1600. The section on the Historic refers to cultural resources post-dating A.D. 1600.

The organization of each chapter necessarily differs somewhat due to both the amount of information available for each time period and the manner in which the variability among resources has been treated in the literature. Thus, the sections dealing with the PaleoIndian and Archaic periods examine the focal area as a whole and relate known remains to regions beyond the study area. The section treating the later prehistory presents culture history by archeologically defined culture "districts," (Wetherington 1968), and the section on historic archeology and resources organizes the data in terms of both the chronology of historic events and major themes (cf. Cultural Properties Review Committee 1973b).

EARLY PALEOINDIAN

Within the study area, the PaleoIndian Period is known through both excavation and site survey and has been a major focus of archeological investigation since 1927 (Cordell 1976). Of reported sites, the

pre-Folsom levels of Sandia Cave (Hibben 1941, 1955, 1957) have a suggested antiquity of greater than B.C. 10,000. Sandia Cave, located on the eastern wall of Las Huertas Canyon, about 15 miles northeast of Albuquerque, has been the subject of considerable dispute. Although radio-carbon dates ranging from 35,000 years ago to 17,000 years ago have been reported (Crane 1955, 1956, Hibben 1955) for the Sandia artifacts, questions have arisen with respect to the association of cultural material and the fossil bone which was radiocarbon dated, the interpretation of the stratigraphic position of the Sandia artifacts within the cave, and other problems (Bryan 1965: 144-124; Irwin 1971: 45; Irwin-Williams n.d.: 7; Judge n.d.: 13; Stevens and Agogino 1975).

The diagnostic Sandia "culture" artifacts consist of two types of distinctive, single-shouldered points, some of which show basal fluting and wear patterns restricted to one lateral edge (cf. Wormington 1957: 262; Judge n.d.: 130). Surface finds of Sandia points have been made in locations from Oregon to the Eastern seaboard. The only site, besides Sandia Cave, where Sandia artifacts have been recovered through excavation is the Lucy Site, about 55 miles east of Sandia Cave in Torrance County, New Mexico (Roosa 1956a, 1956b). The Lucy site; however, has been subject to aeolian deflation and has produced a mixed assemblage including Sandia points, Clovis points, Folsom points and Archaic artifacts.

Wiley (1966: 41), emphasizing the basal fluting on some of the Sandia points, suggests that Sandia may either be ancestral to Clovis or "a contemporary regional variant" of Clovis. Judge (n.d. 13), considering the unilateral wear observed on some of the Sandia points, as well as their widespread geographic distribution, suggests that Sandia "points" may be Clovis knives; therefore a functionally distinctive Clovis tool. Recent re-investigation of the remaining stratigraphy in Sandia Cave, as well as reviews of the published reports, have not demonstrated that the artifacts are indeed of pre-Clovis antiquity, and the finds are generally

viewed with considerable skepticism (Agogino 1968: 2, Irwin-Williams n.d.: 7, Judge n.d.: 14). Great antiquity was initially attributed to an assemblage of crude, chopper-like implements, termed "Los Encinos" found in a chert quarry at Cerro Pedernal near Coyote, New Mexico (Bryan 1931). Although there is some indication that the high quality chert at this locality has been utilized since the Clovis period (Warren 1975), the Los Encinos artifacts probably represent quarry debris and not a distinctive, ancient cultural assemblage (Judge n.d. 14; Wormington 1957: 221).

Clovis artifacts have been consistently and "narrowly dated" to between B.C. 9500 and B.C. 9000 (Irwin-Williams n.d.: 8) and represent the earliest well-documented PaleoIndian manifestation in the Southwest. The diagnostic Clovis artifact is a fairly large (7cm. average length), bifacial, lanceolate point with a concave base. Fluting generally occurs on both faces (occasionally one face), but extends for only a short distance along the length of the point. Flutes frequently terminate in hinge fractures and multiple flutes are not uncommon. Clovis points exhibit heavy basal and lateral grinding (Judge n.d.: 23). A second variety of Clovis point, sometimes referred to as Type 2, is similar to the Type 1 point described above but is generally smaller with a triangular blade which is widest at the base (Wormington 1957: 57-58; Sellards 1940; Hester 1972). Other Clovis artifacts known from excavated sites include transverse end scrapers made on flakes, distinctive side scrapers with converging edges, "ear form" side scrapers, bifacially flaked knives, and graters. Bone artifacts reported include possible points, foreshafts and a shaft wrench (Hester 1972; Haynes and Hemmings 1968; Lahren and Bonnicksen 1974). Excavated Clovis sites generally include mammoth remains, but bison, horse, tapir, camel, cervids, canids, antelope and jackrabbits also occur in some of these localities (Hester 1972; Haynes and Hemmings 1968; Haury, Sayles and Wasley 1959; and cf. Judge n.d.: 22-27).

Unless the Sandia points are included as part of the Clovis assemblage, and Sandia Cave therefore considered a Clovis site, there are no excavated Clovis sites reported within the study area. Clovis artifacts; however, have been recovered

during surveys as surface finds. In their survey of 3000 square miles of the Central Rio Grande Valley, Judge and Dawson (1972, see also Judge 1973) reported a single Clovis campsite and one Clovis "locality." The term "locality" was used to refer to "sites which yielded less than 2 percent of the total number of artifacts per culture" (Dawson and Judge 1972: 1211). Although systematic, this survey employed the technique of "site pattern recognition," a form of purposive sampling in which the environmental correlates of known PaleoIndian sites were first located on aerial photographs and marked localities later visited in the field. The constellation of environmental features examined consisted of playas, dune ridges with views of broad open areas which could have been suitable rangeland for Pleistocene megafauna, and well-developed drainage systems (Judge and Dawson 1972: 1211). Because the survey was designed to maximize recovery of PaleoIndian campsites and a total of 59 PaleoIndian occupational loci were recorded, it is interesting that the two Clovis loci were not considered adequate for comparing other PaleoIndian materials recovered. Judge and Dawson (1972: 1214) do note that the single Clovis campsite recorded was near a water source (playa) which would have been reliable during the prevailing climatic conditions and was as close to the probable hunting area as the more numerous Folsom sites and, therefore, closer to these hunting areas than the later PaleoIndian sites encountered.

Wendorf (1960: 56) noted that Clovis points occur as surface finds in northeastern New Mexico. Lyons (1969: 86) indicates that Clovis sites are rare in the Estancia Valley but reports six isolated surface finds, three near Lucy, one near Progreso (Roosa 1968: 79, 192, 118), one at the Kendall Homestead and one at Lammon Ranch (Haynes 1955: 152). A single unfinished point "which would fall within the range of the Clovis type" was recovered from the Rio Valdez Divide, in the southern Sangre de Cristos, at an elevation of 11,500 to 12,000 feet (Wendorf and Miller 1959). Other lithic materials recovered from this locality were not typologically related to Clovis, and therefore Wendorf and Miller (1959:40, 49) suggest that the Clovis specimen may have been deposited at the site by a later group of people. They consider this particularly likely

because the elevation of the site was above an identified late-Wisconsin moraine.

The potential of the study area for providing significant information about Clovis adaptations will be discussed more fully below, but two comments will be made at this point. First, although the survey by Dawson and Judge might be interpreted as indicating minimal utilization of the Rio Grande Valley by Clovis populations, the only excavated open campsite of the Clovis period lies just south of the study area. This is the large Mockingbird Gap site, situated 30 miles southeast of Socorro, New Mexico (Weber and Agogino 1968; Current Research 1970; Judge n.d.: 25). Second, although Wendorf and Miller (1959) doubt the utilization of high elevations in the Sangre de Cristos by Clovis hunters, Clovis points have been recovered at or above timberline (11,000 and 11,500 feet) in Rocky Mountain National Park, Colorado (Husted 1965: 494).

LATE PALEOINDIAN

Folsom and Midland artifacts have been radiocarbon dated to ca. B.C. 8800 to B.C. 8000 at excavated sites (Irwin-Williams n.d.: 11; Judge n.d.: 53). Folsom points are highly distinctive, lanceolate, fluted points. They are smaller than Clovis points (averaging about 5 cm. in length), fluted on both sides for the length of the point, and basally concave. The lateral edges of Folsom points are carefully finished with pressure retouch and ground along their lower portion (Judge 1970; n.d.: 31). Midland points resemble Folsom points in size and outline but are thinner and lack fluting. Both Folsom and Midland points have been recovered from the same sites, the Scharbauer site, near Midland, Texas is the classic example (Wendorf et al. 1955). Judge (1970) has convincingly argued that despite the morphological similarity between Folsom and Midland points, the two types resulted from quite different manufacturing processes. At the multicomponent Hell Gap site in Wyoming, Midland has been interpreted as overlying Folsom (Irwin-Williams et al. 1973). However, the two radiocarbon dates for the Midland components fall within the range for Folsom (ie. B.C. 8300). On temporal grounds, therefore, Folsom and Midland are considered together in this report. In addition to points, Folsom

assemblages include a variety of scrapers, especially end scrapers, bifacial knives, denticulates and rechettes (Irwin and Wormington 1970). Side scrapers and bone tools are less common than in Clovis assemblages (Hester 1972; Irwin and Wormington 1970). At kill sites, Folsom is most often associated with Bison antiquus, as mammoth and other characteristic Rancholabrian fauna had become extinct by Folsom times. At the Lindenmeier site, a well-documented Folsom camp near Fort Collins, Colorado, faunal remains recovered in addition to bison, included antelope, canids and rabbit. The presence of camel at the Lindenmeier site however has been questioned (Roberts 1935, 1936a, 1937; Wilmsen 1974). Most writers characterize the Folsom complex as an evolution and refinement of Clovis, "the result of the readaptation of existing hunting-gathering populations to altered conditions at the end of the Pleistocene" (Irwin-Williams n.d.: 13).

Two excavated Folsom sites occur within the study area; the Rio Rancho site (Dawson and Judge 1969; Judge 1973) and the Folsom levels of Sandia Cave (Hibben 1941). In addition, Folsom sites have been documented through site surveys (Judge and Dawson 1972; Judge 1973; Lyons 1969), and finds of isolated Folsom points have been reported (Blevins and Joiner 1977; Lyons 1969: 81-86, Kirkpatrick 1976a; Hibben 1951). Sandia Cave yielded remains of two complete Folsom points and two Folsom bases in addition to nonfluted points, other artifacts and faunal remains. Unfortunately, the problems associated with the interpretation of the cave deposits in general preclude evaluation of these data (cf. Wormington 1957:85-86, Judge n.d.: 32, Stevens and Agogino 1975). The Rio Rancho site is located 15 miles west of Albuquerque. An open campsite, it yielded 36 points and point fragments, 108 scraping tools, 12 knives or cutting tools, 16 piercing or incising tools, 21 large bifaces and 37 utilized flakes. Faunal remains were not recovered, and the site was not radiocarbon dated (Dawson and Judge 1969; Judge 1973, Judge n.d.: 32).

The Rio Rancho site was one of 14 Folsom campsites Judge and Dawson (1972, Judge 1973) recorded in their survey of the central Rio Grande. In addition to these campsites, 14 Folsom "localities" were recorded. Compared to the later

PaleoIndian campsites analyzed in this survey, the Folsom sites were closest to playas. These sites also tended to be situated on the northern ends of the potential hunting areas and near these areas but farther from raised over-views than the later PaleoIndian campsites (Judge and Dawson 1972: 1213).

Utilizing both different frequencies of tool types recovered at the Folsom campsites and microscopic determination of "hard" vs. "soft" wear on scraper edges, Judge and Dawson (1972) then defined three types of Folsom campsites. Armament sites contained lithic debris indicative of the processing of the Folsom preform. Armament sites were most consistently located in situations offering a good over-view of the hunting area. Processing sites were defined on the basis of a predominance of tools showing evidence of "soft" wear (polished, rounded, working edges). These sites were statistically significantly correlated with proximity to playas. Base camps were defined in terms of diversity of tools recovered, indicating multiple activities, and were found to be correlated with proximity to sources of fresh water.

The survey data provided by Judge and Dawson (1972) and Judge (1973) are the most comprehensive evidence of Folsom utilization of the study area. Surveys outside the study area include those of Broilo (1971) in the Blackwater Draw area, Lyons (1969) on the Estancia Basin, Wendorf and Hester (1962) on the Llano Estacado, Irwin-Williams (1973) in the Arroyo Cuervo area, and Oaks (1977) in the Nageezi area of New Mexico. Except for the survey by Oaks, the environmental data recorded for the other surveys are not comparable with that of Judge and Dawson, so that it is not possible to test the associations proposed by the latter. It is worth noting that both within the study area and adjacent regions to the north and east, Folsom materials suggesting campsites seem to be absent from high elevation settings (cf. Husted 1965) but do seem to be correlated with water sources which would have been reliable during the period of occupation of the Southwest. Broilo (1971) documented that Folsom artifacts from the Blackwater Draw area came primarily from within the confines of the Draw itself, which would have provided reliable water for bison herds. Lyons

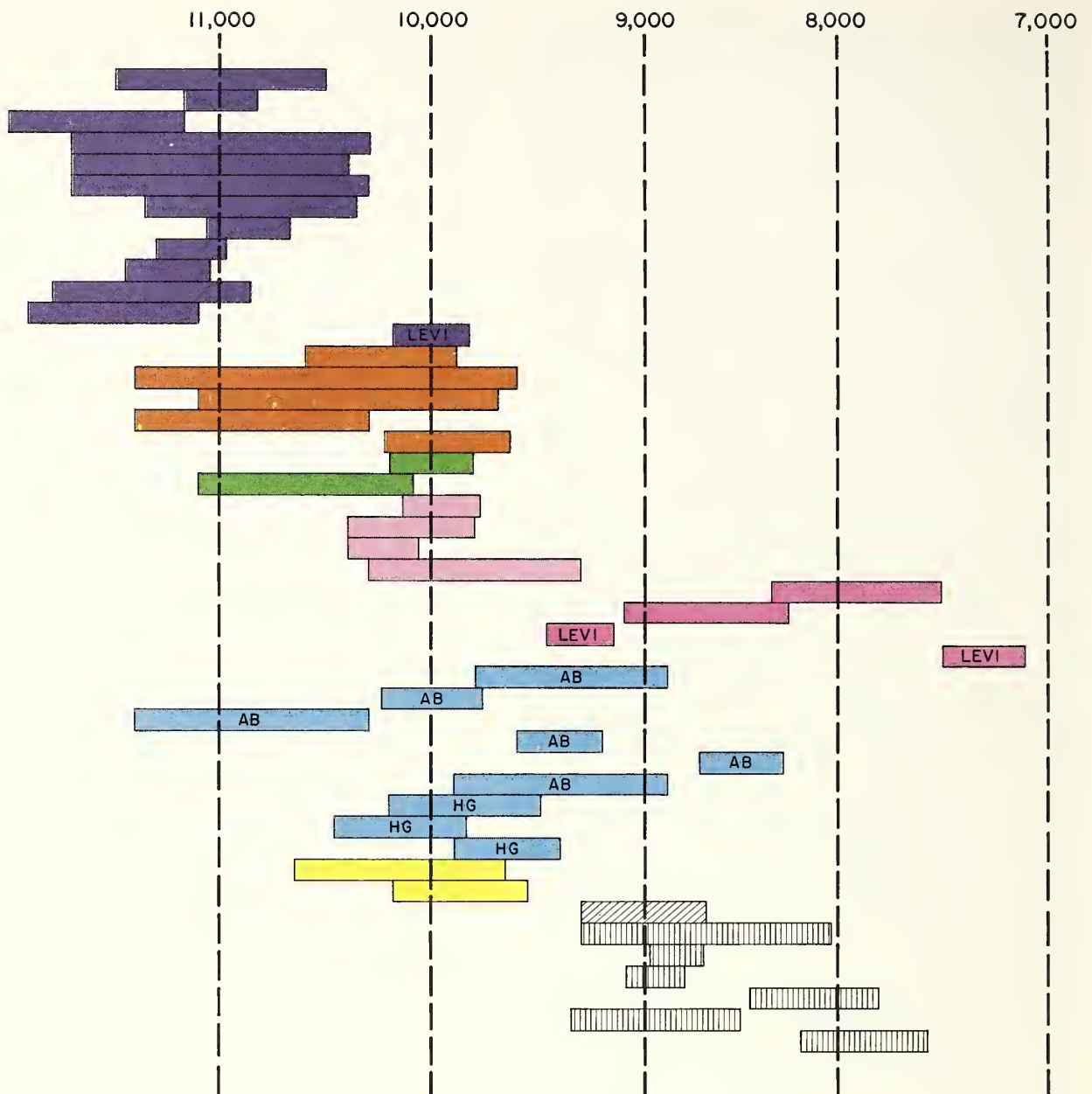
(1969: 81-86) noted a concentration of Folsom sites at both the northern and southern ends of the Estancia Valley, rather than at its western or eastern margins. He suggests that this pattern of site concentration may relate to proximity to the Pleistocene Lake Estancia and to access areas from the High Plains to the Sandia Mountains and the Galisteo Drainage. The Folsom type site (Figgins 1927, Cook 1927, Toulouse 1937, Anderson 1976) is an exception to the patterned positive association with reliable sources of water, but because it is a kill site rather than a campsite may not be expected to conform. The survey by Oaks (1977) was of limited scope but was designed to test the purposive sampling strategy used by Judge and Dawson (1972). Oaks' survey included an intensive ground coverage of one section of the Blanco Trading Post Quad, and site pattern recognition ground check of areas in the Blanco Trading Post, Kimbeto and Pueblo Bonito quads which, on the basis of prior examination of aerial photographs, consisted of a constellation of playas, ridges, arroyos and open potential hunting areas. Oaks (1977) reports that no PaleoIndian material was recovered.

Whereas the relative chronological positions of Clovis and Folsom are quite well-documented through geological interpretations and radiocarbon dates, this is not true of the proliferation of PaleoIndian complexes which characterize the latter portion of the Late PaleoIndian Period.










ASSESSMENT OF PALEOINDIAN CULTURAL SYSTEMS

Problems of Chronology

Figure 1 provides a plot of all radiocarbon dates available for PaleoIndian complexes on the Plains and Southwest. The radiocarbon determinations, except for the temporal priority of Clovis, are insufficient for even minimal interpretation. There is no evidence for the sequential appearance of specific projectile point types. This is particularly important because archeologists commonly use point morphology as the only criterion for the chronological placement of surface finds. Further, although Clovis is widely distributed geographically and other point types are more limited in distribution, geographic boundaries do not



LEGEND

	CLOVIS		AGATE BASIN, HELL GAP
	FOLSOM		FIRSTVIEW
	MIDLAND		ALBERTA
	PLAINVIEW		CODY
	FREDERICK, LUSK		

RADIO-CARBON DATES PLOTTED
AT ONE STANDARD DEVIATION

PALEO INDIAN POINT TYPES & SERIES

Figure 1.

separate areas in which the point types are found, except that Alberta points seem to occur only in the Northern Plains.

The chronological ordering of PaleoIndian point types is based on two sources of information: stratigraphy and technological analysis. Although stratigraphic analysis is reliable, there are only two multicomponent PaleoIndian sites in the Southwest and Plains which contain "diagnostic" point types. These are Blackwater Draw and Hell Gap (discussed more fully below). At both sites, the stratigraphy is not only complex, but the various PaleoIndian points do not always occur within the same locality at each site. The chronological ordering of types, therefore, is based on interpretations of both horizontal and vertical stratigraphy. Technological analysis relies on similarity either in overall point morphology or in specific attributes as a guide to chronological proximity. Overall point morphology, in all likelihood, is the result of several determining factors and not a "genetic" pattern. Therefore, form is not an appropriate temporal indicator in the absence of independent dating techniques. Technological criteria which rely on specific attributes are more promising chronological indicators, and Judge's (n.d.) use of "series" is probably the most sophisticated approach of this kind. Judge (n.d.: 7) offers a taxonomy based on two criteria of basal morphology: the technique used to thin the point and the direction of smoothing of the lateral edges of the point. His trial classification is reproduced in Table 2. However, Judge (n.d.: 7) notes that basal morphology "is closely related to hafting technology, and is, therefore, a sensitive indicator of the function of the

point" (emphasis mine). There is no reason to assume that similarity of function of any set of attributes or artifacts has temporal implications. Rather, it must be demonstrated that the function being monitored is one that is expected to change through time. This has yet to be done. Thus, chronological problems of the PaleoIndian period are far from resolved, and further research should be encouraged.

The late PaleoIndian chronology is important for the study area because of a suggested hiatus in PaleoIndian occupation between Folsom (Midland) and Cody times (or between ca. B.C. 8000 and ca. B.C. 6600). Two multi-component sites, outside the study area, provide information about the chronological positions of post-Folsom remains. Blackwater Draw Locality 1 yields the following sequence, based on the re-interpretation by Haynes and Agogino (1966): Folsom and Agate Basin (considered contemporary), followed by Firstview (formerly referred to as the "Portales Complex"), followed by the Cody Complex. The geologically complex Hell Gap site, near Guernsey Wyoming provides the following sequence, based on material recovered from five separate localities at the site: Goshen (Plainview), Folsom, Midland, Agate Basin, Hell Gap, Alberta, Cody Complex and Frederick (Irwin-Williams et al. 1973, Judge n.d.: 54). Within the study area, isolated finds of Midland, Plainview and Agate Basin points are reported, but Hell Gap points are lacking (Agogino 1961, Judge 1973: 78), as are Alberta and Frederick points. The absence of Alberta points does not seem to be particularly significant, they are known only from sites considerably further north

Table 2: PaleoIndian Projectile Point Series (After Judge n.d.: 9-10)

<u>Series</u>	<u>Types</u>
Fluted Point	Clovis, Folsom
Laterally-Thinned Series	Midland, Plainview (includes Plainview, Meserve, Milnesand) Frederick (includes Frederick, Lusk, Jimmy Allen)
Constricted Base Series	Agate Basin, Hell Gap
Indented Base Series	Firstview (includes Firstview, San Jon, Portales Complex) Alberta Cody Complex (includes Eden and Scottsbluff)

and may represent north Plains manifestations which did not extend into the Rio Grande or the Llano Estacado. The Firstview complex, as defined recently by Wheat (1972) includes both the Portales complex of Blackwater Draw (Hester 1972) and San Jon points from the San Jon site, 24 miles southeast of Tucumcari, New Mexico (Roberts 1943). Wheat (1972: 163-164) considers Firstview to be a central and south Plains manifestation, but Firstview complex artifacts are not reported from the Rio Grande Valley. Thus, Hell Gap and Alberta points fill the interval between Folsom and Midland and the Cody complex on the north Plains, and the Firstview complex partially fills this interval on the central and south Plains. Either the Rio Grande Valley was not utilized by PaleoIndian hunters during this interval or the "Belen" sites comprise the local PaleoIndian manifestation of this time period.

Unfortunately, Belen points have not been dated by chronometric techniques but two lines of evidence indicate that they may date between Folsom and Cody complex in the Central Rio Grande. First, the points have been considered distinctive on typological grounds (Baker 1968, Judge 1973: 69-72). Second, the settlement technology noted for Belen sites (Judge and Dawson 1972) is both distinctive and forms a pattern which fits logically between that observed for the Folsom sites and for the Cody complex, assuming increasing climatic dessication for the entire period. Belen points are non-fluted, laterally thinned, with a slight basal concavity and resemble Clovis points in overall morphology but are smaller in size. In general, they appear related to Milnesand and Plainview types (Judge 1973: 258-259, Judge and Dawson 1972: 1210). Judge and Dawson (1972) recorded nine Belen campsites and four Belen "localities." The Belen sites were found consistently on or very near overviews of potential hunting areas and somewhat farther from water (playas) than Folsom sites. The same intercultural variation in site type (armament site, processing site, base camp) was demonstrated for Belen as had been documented for the Folsom camps.

It should be noted that Irwin-Williams (n.d.: 16) considers "Firstview" and San Jon to be variants of the Cody complex. Her interpretation apparently is greatly

influenced by the palynological evidence for a period of relatively less effective moisture from about B.C. 8000 to about B.C. 6500, which coincides with the Hell Gap and Alberta occupations of the High Plains. The dry period, referred to as the Yellow House Interval (Wendorf 1961) has been documented in the Llano Estacado, but Irwin-Williams believes most of New Mexico was unoccupied at that time. On the other hand, the two Firstview kill sites reported, Olsen-Chubbock (Wheat 1972), and Blackwater Draw Portales complex (Hester 1972) have been radiocarbon dated to B.C. 8,150 + 500 and B.C. 7,890 + 290 (Judge n.d. 45) which is not completely consistent with her view. Irwin-Williams and Haynes (1970: 63) correlate the Cody complex with a return to conditions of relatively greater moisture, suggested by palynological data, dating to ca. B.C. 6,700. On the other hand, Judge (n.d.: 50) notes that radiocarbon dates from the three dated Cody complex sites average ca. B.C. 7,498, which slightly preceeds the expected date based on the paleoclimatic reconstruction. Averaging radiocarbon dates is likely to be misleading, particularly if the range of dates is considerable (see Figure 1), and of 11 excavated Cody complex sites, only six radiocarbon determinations are available. Because Belen and Cody complex sites occur in the study area, the potential for clarifying the dating of these PaleoIndian industries and the climatic conditions in the central Rio Grande Valley coinciding with them is considerable.

The Cody complex includes three varieties of finely flaked projectile points (Eden, Scottsbluff Type I, Scottsbluff Type II) and the distinctive, transverse Cody knife, often made from broken Scottsbluff points (Judge n.d. 48). One excavated Scottsbluff site is reported for the study area. This is the R-6 site, one mile northwest of Sapello, New Mexico, excavated by Dennis Stanford (Judge n.d.: 49), though not yet reported. Judge (n.d.: 49) considers the site a quarry, and states that it yielded 89 lithic implements and one structure but no radiocarbon dates. In addition to R-6, Judge and Dawson (1972) reported 5 Eden (Cody) complex sites and 4 Eden (Cody) "localities" in their survey of the Middle Rio Grande Valley. These sites were located in areas of more pronounced topographic relief than those of the other

PaleoIndian occupations reported. Playas were apparently no longer important as sources of water; rather, the nearest water source tended to be a stream. The sites also were farther from water sources and hunting areas than either Folsom or Belen campsites. Judge and Dawson (1972) suggest that:

. . . by Eden (Cody) times, however, the amount of effective moisture might well have deteriorated to the extent that the playas themselves were no longer adequate sources of water for the animal population. The animals would then seek out grazing areas located closer to streams, rivers, and springs. . . . Human groups at this time would select areas near the game supply for their campsite locations. Indeed all of the Eden (Cody) sites in our sample were found near sources of water which are still running today. (Judge and Dawson 1972: 1214).

It is generally agreed that the Cody complex represents the final PaleoIndian utilization of the study area and that succeeding complexes are Archaic.

Assessment of PaleoIndian Demography, Subsistence, and Social Organization

Most PaleoIndian research has been concerned with chronological questions, either demonstrating the antiquity of man in the New World or determining the relative chronological positions of various complexes (cf. Wilmsen 1965, Cordell 1976). Only since the 1950's, and more recently, has professional archeological interest in delimiting PaleoIndian adaptation developed. It is instructive that discussions which attempt to address issues of PaleoIndian demography, subsistence strategies, and social organization have either been published during the 1970's (Irwin-Williams and Haynes 1970, Dawson and Judge 1972, Gorman 1972, Wilmsen 1970, 1974) or are still in press (Irwin-Williams n.d., Judge n.d.).

In general there are difficulties in assessing PaleoIndian cultures that are related to the great age of the remains and should not be minimized. These include,

but are not limited to, the following: (1) problems in locating PaleoIndian sites because of geological processes of deposition and soil formation which cover and obscure remains; (2) "low site visibility" (Deetz 1972) caused by probable low population densities and the ephemeral nature of sites left by transient hunters and gatherers; (3) problems of site recognition due to the relatively few artifact types that are diagnostic of PaleoIndian cultures; and (4) lack of detail in paleoenvironmental reconstruction, except for a few very small areas which have been the subject of intensive research such as the Llano Estacado (Wendorf and Hester 1962, Wendorf et al. 1974). Nevertheless, Americanist archeologists should keep in mind that we have considerable knowledge of the Middle and Upper Paleolithic archeology of Europe, despite similar problems associated with time-depth, and that much can be said about the adaptation of the Australopithecines, where not only extreme antiquity but the lack of extant analogous species makes behavioral interpretations extremely difficult. Part of the problem in the Americas seems to be that the coordinated interdisciplinary research that is essential to PaleoIndian archeology is not facilitated by the institutional structuring within which most research takes place.

The absence of securely dated pre-Clovis occupations in the Southwest "poses one of the most pressing unsolved problems in American prehistory" (Irwin-Williams and Haynes 1970: 61). Noting that sites which may pre-date Clovis are found primarily in mountain settings Judge (n.d. 62-63) suggests that these human groups "were involved in a generalized, broad-spectrum adaptive strategy that did not make exploitation of the low diversity grassland areas economically efficient." Although presented as a qualified suggestion, Judge's statement indicates that the more mountainous portions of the study area would be the most likely places in the Southwest and Great Plains to provide evidence of pre-Clovis occupation. The major problem; however, is the identification of artifacts which might be of pre-Clovis antiquity. This difficulty is not unique to the Southwest. Those few sites in the Americas that may be pre-Clovis have not yielded standardized diagnostic artifacts. In essence, archeologists do not know what to look for. Further, the notion of a generalized, broad-spectrum adaptive

strategy implies an equally generalized tool kit that would evidence considerable variability from one activity locus to another.

If the problem of locating and identifying pre-Clovis manifestations is to be handled systematically, there would seem to be two potentially useful approaches. First, systematic exploration of rock shelters and cave sites which have yielded Clovis and/or Folsom remains could provide stratigraphic evidence of pre-Clovis occupation. Second, detailed geological investigations could indicate areas where soils of the appropriate antiquity are exposed. The recent restudies of Sandia Cave show that this site is not potentially informative for the first strategy, and, as yet, no other appropriate cave sites are reported in the study area. Two sites, one in New Mexico and the other in Texas probably are useful in this regard. Hermit's Cave (Ferdon 1946, Schultz and Martin 1970) in the Guadalupe Mountains near Carlsbad and Friesenhahn Cave (Sellards 1952, Evans 1961) near San Antonio are logical places to see evidence of pre-Clovis manifestations. The suggested systematic geological research has not yet been attempted, although Lyons' (1969) discussion of the geology and PaleoIndian archeology of the Estancia Basin contains information which would be useful to such a study. Irwin-Williams and Haynes (1970) consider PaleoIndian research in northwestern New Mexico, southern and eastern Arizona and portions of southern California to have been more intensive and interpretations, therefore, more reliable than in other areas of the Southwest, and some general statements are available which may be evaluated. Although clearly interrelated, brief separate discussions are provided about demography, economy, settlement systems and social organization.

Approaches to Clovis demography, and PaleoIndian demography in general, rely heavily on possibly inappropriate ethnographic analogy and controversial computer simulations. Except in "unusual" environmental situations (such as the Aleutian Islands), population densities for modern hunters and gatherers are quite low, (not more than one person per square mile), and band size is small, (not more than about 50 persons). Because Clovis and other PaleoIndian groups were hunters and gatherers, it is generally assumed that group size and population densities were

comparable. The assumption is supported by the lack of storage facilities associated with PaleoIndian campsites which would, if present, indicate potentially larger population aggregates. But, modern hunters and gatherers inhabit the least productive environments in today's world, and there is really no basis for assuming equally low population densities in the absence of competition from agriculturalists. An alternative proposal (which is also not free of ethnographic analogy) by Paul Schultz Martin (1973) assumes that Clovis represents the first migration of man into the Americas and that Clovis population growth and demographic structure would be limited only by the available food supply, consisting of abundant and "unsuspecting" Pleistocene megafauna. Martin's approach has been to estimate the potential Pleistocene biomass available in North America and to simulate the growth and spread of Clovis populations based on the estimated available food. Unfortunately, Martin's work is flawed by so many unfounded assumptions that it provides neither a realistic model nor implications appropriate for empirical tests. For example, he assumes a consumption rate of 10 lbs. of meat per person per day, an exclusive reliance on meat, extreme waste on the part of PaleoIndian hunters, and population growth rates of between 1.4% and 3.4% annually at the migration front. Basic to his model is the notion that Clovis hunters were efficient exploiters of Pleistocene megafauna. (The reader is referred to Martin and Wright 1967 for a more complete discussion of some of these issues.)

Demographic interpretations and analyses of the later PaleoIndian cultures, have generally been pursued in the same manner as discussed for Clovis, and there is little to add. The assumption of low population density and small band size is generally accepted, but this has raised problems of interpretation for two major issues. First, the rather late post-Folsom PaleoIndian kill sites subjected to careful excavation indicate that a tremendous amount of meat was used. The best studies, both outside the central Rio Grande area, are Wheat's (1972) discussion of the Olsen-Chubbock site, in Colorado and Frison's (1974) analysis of the Casper site, in Wyoming. The Olsen-Chubbock site represents a bison jump, and Casper a bison trap. In both cases the amount of meat taken (estimated

from disarticulated bone and butchering marks) is astounding if small group size is accepted; storage facilities in the immediate vicinity of the kills are absent (as they appear to be), and communication and transport were limited to foot travel. Wheat (1972) gives a conservative estimate of 69,000 lbs. of usable meat, tallow and internal organs from Olsen-Chubbock. Frison (1974) estimates 42,000 lbs. of meat, exclusive of tongues, hearts, livers and some other internal organs, for Casper, but suggests that the site may not represent a single incident kill. Even if it is assumed that large, communal hunts were a relatively infrequent event for PaleoIndian populations, it is nearly impossible to account for the processing, transport, and consumption of the amounts of meat indicated.

The second problem in accepting small group size and low population density for the PaleoIndian period arises as the result of recent theoretical explanations for the adoption of agriculture on a worldwide basis at the end of the Pleistocene. Esther Boserup (1965) has argued that technological innovations, particularly agricultural intensification, are the result rather than the cause of population pressure. Lee (1968), on the basis of observational ethnographic data, has demonstrated that hunters and gatherers spend far less time on subsistence activities than do agriculturalists. These two lines of evidence have been used to argue that agriculture is not adopted until and unless groups are under population stress which requires that their food supply be supplemented (Binford 1968; Spooner 1972). If one assumes low population densities for late PaleoIndian and early Archaic hunters and gatherers, the adoption of agriculture during the middle Archaic in the Southwest (and elsewhere) becomes paradoxical. As will be discussed more fully below, the Southwest in general, and the study area in particular, are excellent locations in which to test hypothesis about both the transition to agriculture and agricultural intensification.

Three lines of evidence are generally used to infer subsistence economy of PaleoIndians: archeological remains both faunal and artifactual ethnographic analogy to modern hunters and gatherers, and climatic reconstruction associated with propositions about "appropriate" adaptations to these reconstructed conditions.

Although the archeological remains may be considered the most direct and therefore the most reliable of the three sources of information, there are the generally acknowledged problems of differential visibility and preservation. In essence, 10,000 year old bison bones are both more likely to preserve and be discovered than 10,000 year old hackberry seeds. Further, the tools associated with the killing and processing of large game (projectile points, knives and scrapers) are more distinctive and likely to be preserved than tools associated with the harvesting and processing of plants (digging sticks, baskets, pounding stones). Some of the problems in the use of ethnographic analogy have been discussed in the preceding section. Additional questions will be dealt with in the context of specific PaleoIndian complexes, as will interpretations of climatic reconstructions.

Clovis artifacts, as I have noted, are frequently associated with mammoth, although at processing localities the remains of other, generally much smaller, animals have been recovered as well. The question as to whether or not Clovis hunters were efficient mammoth hunters and whether the economy focused on mammoth or other large game animals currently is under debate. Of the ten Clovis sites from the Southwest and Plains areas which contained enough information for evaluation by Judge (n.d.) for his recent review article, nine sites contained mammoth remains (the exception is Levi Rock Shelter, Zone II, near Austin, Texas, reported by Alexander 1963). The remains of other animals, including bison, horse, camel, antelope, cervids, canids, small mammals, birds and reptiles, were found at five of the ten sites. Judge's (n.d.: 18-22) typology of sites for the entire PaleoIndian period which is based on frequencies of projectile points and scraping tools, the mean number of artifacts per site, completeness of projectile points recovered and the presence of faunal remains, allowed him to make the following distinctions: campsites, kill sites, processing sites, and quarry sites. Of considerable importance, however, is the fact that reported Clovis kill sites did not conform to the pattern of kill sites for later PaleoIndian periods. Judge (n.d.: 27) notes that, based on his criteria, only one site, Miami, Texas (Sellards 1952), qualifies as a kill site. Sites which have been reported as kill sites in the literature

are either processing sites or "unsuccessful" kills according to his criteria. Unsuccessful kill sites show low artifact frequencies, high frequencies of complete Clovis points and no butchering tools. In view of this observation, and recognition of the difficulties associated with dependence on mammoth as a prey species, Judge (n.d.: 60) suggests that Clovis hunters may have been primarily scavengers of mammoth and hunters of bison and diverse other species. Inferences from ethnographic analogy and climatic reconstruction are important to this interpretation of Clovis subsistence.

In a comparative study of hunters and gatherers represented by 58 societies around the world, Lee (1968) found that only 11 societies could be considered primarily hunters in that 50% or more of their subsistence came from hunting. Of these 11, only two live outside the arctic or subarctic regions. These two groups depend about evenly on hunting, fishing and gathering. It is not surprising that hunting rather than gathering is the emphasis in the far north, because the growing season is so short that plant foods are insignificant. Binford (personal communication, 1977) suggests that all hunters and gatherers outside the tropical rainforests are "generalists." The term "generalist" refers to a strategy in which food is taken in proportion to its abundance in a particular environment. For hunters and gatherers in temperate areas (not the arctic), estimates indicate that about 60% of the diet is vegetal food and 40% game, which is approximately the proportions of these foods available. From these ethnographic studies it may be inferred that if Clovis hunters were primarily mammoth hunters, or even primarily big game hunters, they would be an anomaly, unless climatic reconstructions indicated that arctic conditions prevailed during Clovis times. Detailed paleoclimatic reconstructions from Blackwater Draw, on the Llano Estacado (Wendorf and Hester 1975) indicate that during Clovis times there was considerably more moisture in the area than there is today, that summers were probably cooler than at present, but that winters were not cooler than they are now. There is certainly no indication of arctic conditions on the southern Plains (and by extension, the study area) during Clovis times.

Axelrod (1967) discusses one characteristic of late Pleistocene climates, corroborated by the Llano Estacado data, that has bearing on interpretations of PaleoIndian subsistence adaptations. This characteristic is termed climatic equability and refers to thermal moderation or a general lack of seasonal variability in temperatures. In situations of climatic equability, there is no marked periodicity of resources. For this reason, plant food for animals would be generally available throughout the year and seasonal congregation of animals should not occur. (The argument disregards aggregation of animal populations for reproduction.) It has been argued (Duncan 1975) that given conditions of high climatic equability at the end of the Pleistocene, the appropriate subsistence strategy for man would be a generalist strategy and that plant foods should contribute the major portion of human subsistence in temperate latitudes. Thus, in studies of modern hunters and gatherers and of "appropriate" subsistence strategies given the reconstructions of terminal Pleistocene climate, there is the suggestion that plant foods and small animals should have played an important role in Clovis subsistence.

Although these arguments are complex and problems of recognition and preservation in the archeological data compound the difficulties, we may consider the potential of the study area for providing relevant information about Clovis subsistence and that can be used to test a model of settlement patterns that was proposed to explain material from southern Arizona. Duncan (1975) has contended that despite the lack of seasonal variations in resource abundance during Clovis times, one would still expect an uneven distribution of animal populations (potential prey species) because of specific geographic features. Her argument is related specifically to the San Pedro and Sulphur Springs River Valleys in Arizona, and she suggests that the relatively numerous kill and processing sites of the San Pedro River Valley (Murray Springs, Naco, Lehner, and Escapule) reflect the presence of an abundant stream in that valley during Clovis times which would have provided lush grasses attractive to mammoth. She argues that geological evidence indicates that the Sulphur Springs Valley, which has produced a campsite (Double Adobe)

rather than kill sites was predominantly grassland and therefore, an area where evidence of plant utilization and hunting of small game should occur. The study area, as noted, has yielded one Clovis campsite, one Clovis "locality" and finds of Clovis points in high elevation settings. In addition, the Mockingbird Gap site is just south of the study area. No kill sites or processing sites have been recorded in the central or northern Rio Grande Valley. Geological studies of the available campsites and the Clovis "locality" could provide the data to test Duncan's interpretative model. In addition, systematic examination of the high elevation sites and materials recovered from these might provide additional information important to delimiting the range of resources utilized during Clovis times that would be useful for testing the proposed generalist nature of Clovis subsistence.

There is general agreement on the basic context of PaleoIndian adaptations following Clovis. Geological interpretations indicate a general decrease in effective moisture (with some fluctuations) and a concomitant decrease in climatic equability. Further, mammoth and other Pleistocene megafauna had become extinct. The decrease in effective moisture is reflected archeologically by the survey data provided by both the central Rio Grande (Judge and Dawson 1972) and the Blackwater Draw area (Broilo 1971). The fauna associated with post-Clovis kill sites of the PaleoIndian period include Bison, either *B. antiquus* or, presumably later, *B. occidentalis*, cervids, antelope, and small mammals (cf. Judge n.d.: table 1). Excavated campsites and processing sites have yielded the remains of antelope, cervids, canids, rabbits, other small mammals, birds and reptiles. Despite the apparent diversity in faunal remains, there is general agreement that post-Clovis PaleoIndian adaptations were focalized on bison hunting (Irwin-Williams n.d., Judge n.d.). Judge (n.d.: 61-62) notes an association between his projectile point "series" and the numbers of bison represented at kill sites. Excluding Clovis, the "Fluted Point series" (Folsom) and the "Laterally Thinned Series" (Midland, Plainview, and Frederick) are associated with an average of 29 bison per kill site. Folsom materials yield the lowest number of bison per kill site an average of 15.25 with 23 as the maximum number. Both "Constricted Base Series" (Agate

Basin, Hell Gap), and "Indented Base Series" (Firstview, Alberta and Cody Complex) are associated with an average of 128.8 bison per kill site. "Viewed as an association between generalized (combined knife/piercing functions) projectile points represented by the Fluted and Laterally-thinned series, and points specialized for piercing functions (Constricted and Indented Base series), it can be seen that distinctions between the subsistence strategies may be reflected in lithic technology as well" (Judge n.d.: 61-62).

The significance of these associations is not clear, and the data presently available do not indicate further consistent associations. The distinction in size of kill is not correlated with the type of bison (*B. antiquus* vs. *B. occidentalis*), type of kill (trap vs. jump), geographic area (north vs. south Plains or east vs. west Plains), or time period (see Figure 1). The range of reported PaleoIndian point types in the study area includes representatives of each of Judge's series, and if for no other reason, the area is important for further interpretations of PaleoIndian subsistence economy. The lack of reported kill sites in the study area should not detract from the potential significance of the data available. Campsites do occur and could be highly informative, because they provide the greatest diversity of artifact types as well as faunal remains. If they are well preserved, the sites are useful for paleoenvironmental and subsistence reconstructions. In addition, the environmental contexts of reported isolated point and point fragment finds (e.g., Henderson 1977a, 1977b, 1977c) might contribute to the reconstruction of the range of settings used or visited by PaleoIndian groups. In the case of isolated artifacts; however, considerable caution must be exercised because more recent groups (especially Utes and Apaches) scavenged PaleoIndian and Archaic points. Lithic scatters that include debitage may eventually provide unambiguous evidence of PaleoIndian use. It should be possible to date debitage directly through obsidian hydration if obsidian is present. If obsidian is lacking, it may be possible to differentiate lithic scatters by determining reduction techniques that are specific to PaleoIndian peoples.

The only systematic attempt to study the

settlement technology of Late PaleoIndians is the survey reported by Judge and Dawson (1972) and Judge (1973). The results of this survey have been discussed. Although I consider that the information gathered during this survey is completely reliable, I am not convinced of the ultimate value of "site pattern recognition" or any other form of purposive sampling. Site pattern recognition was used because it was efficient in terms of man-hours spent in the field (Judge 1973). This is the reason for all sampling strategies. The problems with site pattern recognition are that it lacks potential for adding new information about the environmental correlates of site locations, and the strategy cannot go beyond empirical generalization about site distribution. Thus, Judge (1973) suggests that site pattern recognition should be tested outside his survey area. Oaks (1977) did this and encountered no PaleoIndian sites. Since Judge and Dawson (1972) and Judge (1973) do not indicate how frequently they failed to find sites in their survey area, there is no basis for evaluating the significance of Oaks' (1977) results. Further, if Oaks had been successful in locating PaleoIndian sites, we would have learned nothing beyond what we already know.

The two studies explicitly designed to monitor social organization among

PaleoIndian groups have been conducted outside the study area. These are Gorman's (1972) investigations of Clovis data, and Wilmsen's (1972, 1974) reexamination of Folsom materials from the Lindenmeier site in Colorado. Gorman's study has been criticized, because he showed a lack of familiarity with his data. The results of neither of these studies can be considered conclusive. For this reason, the specific results will not be discussed here, but the basic similarity in the procedures employed to reconstruct social organization is worth mention. In both cases, the investigators used technological analysis of artifacts and differential variability in artifact attributes in order to infer the composition of the social groups responsible for the manufacture and use of the artifacts. In contrast to Judge's (n.d.) approach, Gorman and Wilmsen expect variability in projectile point attributes to reflect different social groups rather than different functions. It can be suggested that future research proceed along two lines if archeologists are to better understand what attribute variability monitors. One line of enquiry should be experimentation, specifically the approaches currently being used by Frison (1974) and Tringham (1979). Second, continued ethnoarcheological observation, as currently being pursued by White and Thomas (1972) would seem to be essential.

THE ARCHAIC PERIOD

INTRODUCTION

Within the study area, the Archaic is known from recent work in the Abiquiu Reservoir District (Schaafsma 1975, 1976, 1977), White Rock Canyon-Cochiti Lake (Biella and Chapman 1975, 1977, Chapman and Biella 1977); investigations west of Albuquerque (Reinhart 1967, 1968, Schaafsma 1968, Campbell and Ellis 1952, Agogino and Hester 1953, Lent and Schalk 1977); scattered information from the Chama area (Snow 1975, Warren 1975), the Cimarron (Steen 1955, Thoms 1976), the Galisteo Basin (Lang 1977a, 1977b, Honea 1969), and the Pajarito Plateau (Hill 1978). Although difficult to assess some of the material from the northern Rio Grande, (Renaud 1942, 1946, Ansalone 1971, Hume 1974a, 1974b) may be related to the Archaic.

Major problems associated with the Archaic include those mentioned for the PaleoIndian period (ie. remains obscured by geological processes of deposition, low site visibility, few diagnostic artifact types, and lack of detailed paleoenvironmental studies). In addition, unlike PaleoIndian research, the Archaic has been neglected by archeologists until recently, and some problems result directly from the nature of Archaic and subsequent Pueblo adaptations. Briefly, the early part of the Archaic is characterized by mobile populations of hunters and gatherers, relying about equally on wild plant foods and relatively small game (deer, antelope, rabbits etc.). In the later part of the Archaic this basic pattern is continued with the addition of cultivated maize to the subsistence base. Puebloan adaptation is differentiated by increased dependence on horticulture and sedentary communities, but throughout the Pueblo sequence (and well into the historic period), hunting and gathering wild food plants continued as a supplementary economic activity. Thus a major problem is distinguishing limited activity loci reflecting hunting and wild plant food processing associated with the later Pueblo period, from sites reflecting those activities as practiced by Archaic period groups. It is important to note that criteria which, on logical grounds, might be used to differentiate Archaic from Pueblo limited activity

sites, are inadequate. Two of these criteria, the presence or absence of ceramics and the presence or absence of fire-cracked rock, are briefly discussed as examples. Ceramic vessels for storage and cooking are a major diagnostic of the puebloan period, because heavy, yet easily broken containers are used by sedentary rather than highly mobile groups. On the other hand, Pueblo hunters would not be expected to carry pottery vessels any great distance from villages, and the remains of their over-night camps would be characterized appropriately as a-ceramic (rather than pre-ceramic).

Loci which were used for hunting or plant processing by Archaic groups were also, apparently, often revisited by later Pueblo groups. Particularly if such loci are exposed through wind erosion, the assemblages recovered frequently contain both Archaic tools and ceramics. Thus, the Atrisco sites first documented by Campbell and Ellis (1952) contained both ceramics and lithics although the ceramics were considered intrusive remains of later groups, and the Atrisco assemblage of lithics is generally accepted as a late Archaic manifestation (Irwin-Williams 1967, Irwin-Williams n.d.). Many Archaic sites contain abundant fire-cracked rock, the result of a food preparation technique referred to as basket-boiling. (Baskets cannot be placed directly over an open flame. Tightly woven baskets or baskets coated with pitch hold liquid that can be heated by dropping hot rocks into the basket). Nevertheless, the presence of fire-cracked rock is not an unambiguous clue to pre-ceramic occupation. Brugge (1965) notes that both Eastern and Western Navajo occasionally used agave and that both used rocks, either in or out of pits, as part of their agave roasting technology. Anasazi use of agave is also documented (Euler and Chandler 1978). If agave is or was present and utilized in a particular setting, fire-cracked rock may not a priori be attributed to Archaic peoples. The difficulties in distinguishing Archaic sites is most obvious in the examination of survey records. The site files of all institutions involved in work in the study area contain hundreds of records of "lithic scatters" of unknown cultural affiliation

(ie. possibly Archaic, Pueblo, Navajo or Apache).

An understanding of the Archaic is critical to both the culture history of the study area (and to the Southwest in general) as well as to questions of major theoretical importance in contemporary archeology. With respect to culture history, whereas specific PaleoIndian "cultures" are geographically widespread in North America (see preceeding section), it has been suggested (Irwin-Williams 1967) that during the Archaic 1) the Southwest becomes a distinctive culture area for the first time, and that 2) the area is characterized by sufficient internal, geographic heterogeneity that distinct traditions, which continued into later periods, may be defined. In regard to theoretical issues, it has been noted that during the later portion of the Archaic, horticulture was adopted by various groups in the Southwest. Specifying the conditions under which domestication of plants (and animals) occurs and spreads is of major importance to both current archeology and anthropology (cf. Ucko, Dimbleby and Tringham 1972, Spooner 1972, Boserup 1965, Binford 1968).

Although concerned with excavations outside the study area, the only systematic attempt to synthesize and study both the culture history and adaptive technology of the Archaic groups in the Southwest is Cynthia Irwin-Williams' (1967, 1973, n.d., and Irwin-Williams and Tompkins 1968) work in the Arroyo Cuervo area (between the Rio Puerco of the East and the Jemez River). Both because Irwin-Williams' scheme is widely used and because it applies to the study area, a brief discussion of her approach and results are given as background to further discussion of the Archaic in the central and northern Rio Grande.

Throughout North America (and in fact, most of the world), the end of the last Pleistocene glaciation and the concomitant shrinking of grassland areas provided the background for the development of adaptations based on intensive hunting and gathering of locally available resources. The nature of the adaptation is reflected in broad similarities in types of sites and artifact inventories. Irwin-Williams (1967) suggests that the Southwest shares certain culture traits with other Archaic cultures

of western North America principally because of the basic similarity in adaptation. These traits, she argues, must be separated analytically from those which are specific to the Southwest and which derive from its particular culture history. Thus, she considers rather sparse populations and settlement types that include caves and rockshelters, camps near lake shores and camps on level ground near springs and streams as characteristic of the Archaic of Western North America in general. Within this broad pattern, the Southwest is somewhat set apart by sites representing seasonal mountain hunting camps, sites on sand dunes, in alluvial valleys and on mesa tops. Using this basic analytical dichotomy, Irwin-Williams (1967) distinguishes the elemental southwestern culture, which she terms PICOSA, (an acronym derived from three relatively well-known archeological units: Pinto Basin, Cochise and San Jose) characterized by the specific site locations mentioned above, the early adoption of domestic crops, circular dwellings with depressed floors, lack of bone, shell or stone beads or pendants, specific projectile point types and types of other chipped and ground stone items, bone awls made on split or whole metapodia, coiled basketry, and later, gourd vessels, cane cigarettes, wooden hoops, "tablitas" and "pahos." Continuing the second level of analysis (ie. those traits that are distinctive of culture-historical relationships), Irwin-Williams (1967, 1973, n.d.) distinguishes four geographical culture areas within the Southwest and two major, distinctive temporal periods. It is her "northern sector" which is of concern here; this includes northern Arizona, southeastern Utah, southwestern Colorado and northwestern New Mexico (Irwin-Williams, n.d.: 18). This area is recognized by a distinctive constellation of traits which distinguish it from other areas within the Southwest, and that indicate culture-historical relationships. The manifestations of this area are termed the Oshara Tradition by Irwin-Williams (1973), which she believes shows enough continuity with Anasazi to be considered the origin of the Anasazi.

The Oshara Tradition seems to have begun somewhat later than the Archaic manifestations to the south and west of it. Irwin-Williams (n.d.: 22) notes that the PaleoIndian Cody complex continued in the

northern Southwest until about 6000 B.C., whereas at this time in the south and west Archaic manifestations were well underway. She relates this rather prolonged PaleoIndian use of the northern sector to the gradual eastward and northward shrinking of grasslands at the end of the Pleistocene. The earliest Archaic manifestation in the northern area, the first phase of the Oshara Tradition, is referred to as the Jay Phase, which Irwin-Williams dates to between about B.C. 5500 and B.C. 4800. Diagnostic Jay Phase artifacts include large, slightly shouldered projectile points, well-made leaf-shaped knives, and "numerous very well-made scrapers" (Irwin-Williams 1973: 5). The projectile points, "Jay points," are probably the most distinctive items in this inventory. Irwin-Williams (1973: 5, n.d.: 23) suggests that Jay points are most closely related to "Lake Mohave" points, known from sites in California and Arizona. There are two aspects of this interpretation which are worthy of note.

First, Irwin-Williams is using characteristics of the lithic assemblage (particular projectile point morphology) as an indication of cultural affiliation. Second, she views the northern Southwest as having been abandoned by PaleoIndian peoples, who presumably moved further east onto the Plains; after a brief hiatus in occupation, the area was reinhabited by Archaic peoples whose closest cultural affiliations lie to the west. As she notes (1973: 4-5) "no generic connection" is seen between Cody and Jay phase assemblages. It is worth mentioning here that some of Irwin-Williams statements on Oshara origins reflect her position with respect to a typological argument. "Jay" points are, in outline, quite similar to Hell Gap points, and some writers (cf. Honea 1969) view Jay material as a development out of a PaleoIndian base, specifically Angostura assemblages from the Plains. Irwin-Williams, on the other hand, regards this resemblance as fortuitous and sees a much closer relationship between Jay assemblages and Archaic material of the western Southwest. Without having examined Jay assemblages, I cannot offer an opinion on either position. I suggest, as I did for the PaleoIndian complexes, that until we know what variation in projectile point morphology means in terms of behavior, all interpretive statements are based on as yet unsupported assumptions.

Further, if the Jay Phase represents an Archaic adaptation, it is entirely reasonable to me that many of the artifacts which characterize Jay assemblages will reflect the functional requisites of this adaptation and will therefore more closely resemble artifacts from the western portion of the Southwest where plant food processing and small game hunting are well-documented from about B.C. 9000 (Rogers *et al.* 1966). Basically, I suggest that further work is necessary before specific artifact classes or attributes of artifacts are assigned either functional or cultural-historical meaning in terms of the analytical dichotomy which Irwin-Williams (1967), rightfully, argues, must be made.

ARCHAIC ASSEMBLAGES

The potential of the study area for clarifying these problems is quite high. In the early 1940's, Renaud (1942; 1946) published a description of what he termed "Upper Rio Grande Culture." In fact, the term encompassed a diversity of lithic assemblages, probably representing both a variety of activities and considerable temporal depth. "Upper Rio Grande Culture" artifacts are distributed along the northern portions of the Rio Grande in New Mexico, with particular concentrations in the Taos area and along the bluffs above the Chama. Artifacts which would fall within this broad category are known from the Chiflo site (Ansalone 1971), and Garrapata Ridge (Hume 1974b) both north of Taos. Similar artifacts are known from the Cimarron area (Thoms 1976, Kirkpatrick 1976a, 1976b). While agreeing that "Upper Rio Grande Culture" was too broadly defined to be meaningful, Honea (1969: 60) argues that one of Renaud's point types, ("Rio Grande subtype 1") would be classified as a Jay point. Honea himself refers to the form as a Rio Grande Point. One component of the excavated La Bolsa site (LA 356), in the Galisteo Basin (Honea 1969), yielded a diversity of artifacts and should be compared with Jay assemblages from the Arroyo Cuervo Area. Hume's (1974b) artifacts from Garrapata Ridge also should be compared with the full range of Jay artifact types. Finally, excavations at Pigeon Cliffs, in the Cimarron area, (Steen 1955) yielded an Archaic assemblage and a radiocarbon date of 8,282 \pm 1,000 years ago. The Archaic material was termed the "Clayton Horizon." Neither the minimal

artifact descriptions for the Clayton Horizon or the single radiocarbon date would permit more than speculation, but the presence of what may be quite early Archaic material on the eastern edge of the study area indicates that a thorough examination of this locality might clarify the notion of eastward and northern "drift" of PaleoIndian populations and the cultural affiliations of Rio Grande Archaic groups. One of the most daunting difficulties in approaching the problem is really a matter of diverse terminology, and it is my hope that this discussion will provide a guide to terms used in the literature so that this particular confusion may eventually be resolved.

In the Arroyo Cuervo area, Irwin-Williams (1973) terms the succeeding Archaic development the Bajada Phase. It is known from three excavated localities and "numerous surface sites" (Irwin-Williams 1973: 6). She dates the Bajada Phase to ca. B.C. 4800 and B.C. 3200, on the basis of radiocarbon determinations. The Bajada Phase tool assemblage shows general continuity with the preceding Jay Phase. Early Bajada Phase points are distinguishable from Jay points by the presence of basal indentation and basal thinning. Later Bajada Phase points have increasingly well defined shoulders and show a decrease in over-all length. In addition, the assemblage contains "increasing numbers of large chopping tools and poorly made side scrapers on thin irregular flakes" (Irwin-Williams 1973: 7). Small, cracked cobble filled hearths and earth ovens are associated with base camps. Irwin-Williams (1973: 7) considers some of Renaud's Rio Grande Complex, the Moab Complex and Aneth Complex of southeastern Utah similar to the Bajada Phase. The Bajada Phase represents the last Early Archaic manifestation in the Arroyo Cuervo Area. In the following section an assessment of the Early Archaic will be made; however, as Irwin-Williams views it, the Early Archaic of the northern Southwest represents a cultural tradition distinctly different from that of the preceding PaleoIndian period and most closely resembling older Archaic manifestations of Arizona and California. She also sees considerable continuity between the Jay and Bajada Phases with change between and within these phases as quite gradual (Irwin-Williams 1973, n.d.).

The San Jose Phase of the Later Archaic, as defined in the Arroyo Cuervo area,

would date to from slightly before B.C. 3000 to about B.C. 1800. Similar materials have been recovered from western New Mexico, where they were termed the San Jose Complex (Bryan and Toulouse 1943), from the Acoma area of New Mexico, where the term San Mateo Complex was used, and from south central Colorado, where the name Apex complex was applied (Irwin-Williams and Irwin 1966, Irwin-Williams 1973). Similarities are also seen with the Moab and Aneth complexes, previously mentioned. San Jose points manifest continuity with the preceding Bajada Phase, but serration along the blade is more frequent, decreasing length is an overall trend and the stem to blade ratio becomes relatively shorter. The tool kit is dominated by poorly made side scrapers on thin flakes and large chopping tools. Well made side scrapers and the bifacial knives of the earlier Archaic complexes are rare or absent (Irwin-Williams 1973: 8). Ground stone implements include pounding stones, shallow basin grinding slabs and manos made on simple, small cobbles. Large, cobble filled subsurface ovens are features that accompany San Jose Phase camps (Irwin-Williams 1973: 8). One locality in the Arroyo Cuervo area yielded an irregular post-hole pattern which suggests a temporary structure. In the study area, Schaafsma (1976) reported 4 San Jose points associated with other Archaic artifacts in the Abiquiu Reservoir district. As discussed below, other sites are often referred to as "Late Archaic," presumably because of the absence of projectile points (e.g., Snow 1973a; Chapman and Biella 1977).

The succeeding phase of the Late Archaic (dated from about B.C. 1800 to about B.C. 800) is both critical to our understanding of the dynamics in the Rio Grande area and the focus of differences of opinion. The major "event" during this time period is the documented appearance of maize, derived ultimately from Mexico, within the context of a basically Archaic way of life. In the Arroyo Cuervo area, Irwin-Williams (1973) terms this period the Armijo Phase and notes that "specific developments within the tool kit were mostly continuations of trends from the preceding phase." (Irwin-Williams 1973:11). Thus, late forms of the San Jose projectile points "evolved," but subsequently there was increased internal variety in this class of artifacts, including shallow corner notched or narrow stemmed forms. In the Arroyo Cuervo

area therefore, maize appears to have been accepted by local populations, and no discontinuity in the Oshara Tradition is seen. However, Irwin-Williams (n.d.: 39) notes that in portions of northeastern Arizona the introduction of maize is associated with assemblages resembling contemporary versions of the "Cochise Culture" (an Archaic manifestation documented primarily from southern Arizona and northern Mexico). In addition, Lang (1977b and personal communication 1978) notes that at around 1500 to 1000 B.C., in the Rio Grande area, the Late Archaic is characterized by "physical and adaptive traits typical of the northern Mexico-based Cochise Tradition . . . with an apparent truncation of the Oshara pattern" (Lang 1977b: 2). Lang's interpretation is heavily influenced by his observations of Late Archaic material from the Galisteo Basin (Lang, personal communication 1978). Although Irwin-Williams and Lang base their differing views on examination of materials which are spatially separated (and each may be correct for the respective areas), the underlying issue of the dynamics of cultural change is central to this problem and the interpretations of later prehistoric developments in the study area and the Southwest as a whole. The basic issue is how much of Southwestern prehistory can be explained as a result of internal cultural responses and how much attributed to rather direct influence from northern Mexico. In this case, there is no question that maize was domesticated originally in Mexico and subsequently adopted in the Southwest. The problem is whether the mechanism for this introduction of maize involved the actual movement of "Cochise" peoples into the northern Southwest or whether local pressures necessitated the adoption of cultivation by peoples who, although they probably were well aware of maize, had not previously been able or "needed" to incorporate this crop into their economic base. No attempt can be made to solve this problem here. An acceptable solution must involve two levels of approach. First, the distinctiveness of the entire Chiricahua Cochise Phase and Armijo Phase assemblages must be clearly delineated, and this delineation must involve a consideration of parallels which are to be expected on the basis of similarities in artifact function. Second, the context in which agriculture is adopted by any population must be evaluated in the light of our current theoretical knowledge.

The latter question is examined briefly in the following section where settlement patterns and paleoclimatic reconstructions are examined.

In the Arroyo Cuervo area, Irwin-Williams (1973) refers to the succeeding phase as the En Medio Phase, which she suggests dates to between B.C. 800 and A.D. 400. This is followed by the Trujillo Phase, which is dated to between A.D. 400 and A.D. 600. She notes that the En Medio tool kit shows considerable continuity with that of preceding phases, although there is an increased emphasis on ground stone tools and further stylistic variability in the total assemblage. En Medio Phase projectile points:

are variations of stemmed corner notched forms which trend through time toward the use of increasingly long barbs. Bifacial knives and drills occur in small numbers near the beginning of the period, and increase in importance through time. However, the great bulk of the tool kit, comprising flake scrapers and knives, crude choppers and pounders, continued little changed from the preceding phase. . . . Materials from the short Trujillo Phase generally represent continuations of trends established in the En Medio. Two major innovations are the introduction of the bow and arrow . . . and limited quantities of plain grey ceramics. (Irwin-Williams 1973: 13).

The importance of the dating of the En Medio and Trujillo Phases is that together they span the transition from late Archaic to Basketmaker II and early Basketmaker III. The emphasis placed on continuity in artifact inventories indicates that Irwin-Williams views the Oshara Tradition as an in situ development from early Archaic through to the Pueblo-Anasazi sequence in the Arroyo Cuervo area.

The basic continuity in artifact assemblages between Archaic and Anasazi Basketmaker has been documented on the basis of the excavation of several sites west of Albuquerque, in the study area (Reinhart 1968). The area investigated and reported by Reinhart encompasses land held by Rio Rancho Estates and Volcano Cliffs development corporations. Sites

were located on aeolian sand surfaces in an area which, today, lacks permanent water. The cultural sequence developed by Reinhart (1969) is: Atrisco [which Irwin-Williams (1973) includes as Late Archaic], Rio Rancho Phase, which Reinhart considers the local manifestation of Basketmaker II, and the Alameda Phase, the local Basketmaker III. Although radiocarbon dates were not obtained for the Atrisco sites, the Rio Rancho Phase was dated to B.C. 962 \pm 162 and B.C. 108 \pm 206, by two samples and thus is approximately contemporary with the En Medio Phase. Although Reinhart's work was done prior to Irwin-Williams investigations in the Arroyo Cuervo area, he (1967) notes that his Rio Rancho Phase resembles both San Pedro Cochise and later Basketmaker II materials (from Durango, Colorado). Some of his published photographs of projectile points, would seem to fit those examples published for the En Medio Phase (Irwin-Williams 1973).

ASSESSMENT OF ARCHAIC CULTURAL SYSTEMS

As noted above, archeological interest in the Archaic is quite recent. This seems to be a reflection of the facts that Archaic remains are not archeologically rich (in ornamental items, for example) as are later Pueblo sites, and they are not important to the problem of establishing the time of man's entry into the Americas, which stimulated much of the PaleoIndian research. General archeological interest in the origins of agriculture in both the Old World and the Americas (MacNeish 1971, Binford 1968), and the theoretical issues involved in explaining both the beginnings of agriculture and its spread provide the context for the admittedly still limited study of the Archaic in the Southwest. Prior to the 1950's and 1960's, the "invention" of agriculture by man was seen as almost a natural outgrowth of an "evolutionary trend" toward more complete control over the natural environment. As such, it did not merit the development of an explanatory framework. The recognition that hunting and gathering require less intensive labor investments than agriculture as well as archeological evidence that the first crops domesticated were not highly productive (Harlan 1967, Flannery 1968), indicated that agriculture had to be explained. The current explanatory model

relies heavily on Boserup's (1965) argument that demographic pressure is the independent variable in causing technological change. In the archeological literature, the theoretical framework is elaborated in the seminal work of Binford (1968). Briefly, two conditions are important to the theoretical base. First, (as elaborated by Binford 1968), current models depend on documenting a condition of population disequilibrium occurring in an area where potentially domesticable plants (or animals) exist. Simply stated an area which supports low density hunting-gathering populations is seen to receive increments of people, "displaced" from sedentary communities outside the area. The increased numbers of people are forced to develop the more intensive strategy involved in plant domestication. (In theory, population disequilibrium could also occur if depleted game forced hunters and gatherers to supplement their diets with cultigens.) The second condition (elaborated by Flannery 1968) involves the notion of scheduling and is not incompatible with population disequilibrium. Scheduling is based on the observation that edible foods are not equally available at all times of the year, and hunters and gatherers must schedule their activities to coincide with local abundance of food (essentially one can't be two places at once). In making scheduling decisions, it is clear that some resources will be neglected, but it is assumed that time will be spent on those resources which are most productive, and these may in turn be potential cultigens.

It should be noted that although these conditions relate to areas where domestication first occurred, they are not inapplicable to the Southwest where already domesticated plants were adopted. Again, based on the observation that agriculture requires a higher labor investment than hunting and gathering, coupled with the notion that the principle of least effort is applicable to man, there would have to be a reason for the acceptance of agriculture. Also, as noted, the Southwest is distinguished as a distinctive culture area (Irwin-Williams 1967) in part because of the relatively early acceptance of agriculture.

With this background, specific questions about Archaic cultures involve: 1) monitoring the climatic conditions under which the cultural adaptations took place; 2) delimiting the demographic structure, particularly

changes in population density; and 3) defining the economic base both prior to and after the adoption of cultigens. These specific issues are discussed below, although admittedly the data critical to them are minimal.

ARCHAIC PALEOCLIMATIC RECONSTRUCTION

Few paleoclimatic studies on the Archaic are available, and those that have been done are based on geological interpretations and pollen profiles (e.g., Irwin-Williams and Haynes 1967, Mehringer 1967, Irwin-Williams and Tompkins 1968), which do not provide the fine detail that archeologists would find most useful. Nevertheless, an overview is given here. There is general agreement that increased climatic desiccation characterized the post-Pleistocene climate of the Southwest, but the precise dating of the onset of this desiccation trend, as well as internal fluctuations within it, are not well-documented. Probably most significantly for the present study, there have been no paleoclimatic reconstructions within the study area which are of the appropriate time depth. Geological studies of the San Augustin Basin (Powers 1939), Lake Estancia (Bachuber 1971) and the Llano Estacado (Haynes 1975) (summarized in Cully 1977) indicate the following: a decrease in moisture, indicated by a lowering of the shoreline, in the San Augustin Basin prior to 3000 B.C.; desiccation in the Estancia Basin, documented by the disappearance of Lake Willard, at 4000 B.C., and a cycle of erosion on the Llano Estacado between B.C. 5000 and B.C. 3000. Palynological data from southern Arizona and southwestern New Mexico (Martin 1963), from western New Mexico and eastern Arizona (Schoenwetter 1962) and from southeastern Arizona (Mehringer 1967) are both scant and contradictory for the same time period. Briefly, although Martin (1963) thought the pollen data from southern Arizona indicated a warmer and possibly wetter interval between B.C. 6000 and B.C. 4500, Mehringer's (1967) more recent work in the same area has not confirmed this. Mehringer's (1967) study suggests a dry interval instead. Schoenwetter's (1962) work refers primarily to seasonality in rainfall.

As noted in the previous section, Irwin-Williams (n.d.: 22) relates the rela-

tively late appearance of the Early Archaic in the northern Southwest to the continued presence of the grasslands which would have supported large game and a PaleoIndian way of life. Although this may be true, the available data do not seem sufficiently detailed to support this conclusion, particularly with respect to a continuation of grasslands on the eastern margins of the Southwest. Irwin-Williams' (1973: n.d.) interpretations are, of course, based on both archeological data (particularly dated assemblages and site distribution) as well as on paleoclimatic reconstructions, but if changes in climate are viewed as causal, then they must be monitored independently. Thus, the relatively later beginning of the Oshara tradition, compared to Archaic manifestations in the southern Southwest is neither well-documented or explained. Clarification might come from two sorts of research. First, in view of the relatively early dates for the "Clayton Horizon" noted above, intensive survey and excavation on the western plains margins (including such areas as the Galisteo Basin) should be carried out. It is significant, in this regard, that recent work in southeastern New Mexico dealing with the Archaic "Hueco Complex," has yielded quite early dates for Archaic assemblages and maize (Wimberly 1972, Irwin-Williams n.d.: 44). Second, systematic paleoclimatic studies, using several techniques, should be carried out in the study area. Because most of the Archaic sites in the study area consist of surficial deposits with no perishable material, detailed geological studies, perhaps along the lines pursued by Hall (1977), would be valuable. Recent studies have indicated that it is possible to extract pollen from sand dune locations (David Snow personal communication, 1978), so this technique of paleoenvironmental reconstruction should be considered. Cave and rock shelter locations which are located should be given particular attention, because they often do preserve otherwise perishable remains. I suggest that obtaining the usual few pollen samples from rock shelter deposits is not sufficient. In order to fully assess the climatic regime during the Early (and later) Archaic, geological studies of cave deposits (specifically chemical analyses done with the assistance of trained geologists) need to be conducted, microtine rodents identified, all vegetal material analyzed, etc.

There is some agreement that in the widely

distributed areas of the San Augustin Basin (Powers 1939), the Llano Estacado (Haynes 1975), Estancia Basin (Bachuber 1971), and southeastern Arizona (Mehring 1967), there was an increase in available moisture at about B.C. 2000. Using the methods suggested above, this should be examined within the study area. The period from about B.C. 2000 to A.D. 400 is certainly one of the most critical for understanding cultural changes, since it was during this time that cultigens were adopted in the Southwest. Nevertheless, the period is not well known. Powers' (1939) study indicates that the San Augustin Basin contained its peak of about 100 feet depth of water at about B.C. 1500 and that there was a shrinkage of the lake thereafter with a particularly dry interval at about B.C. 500. In the Estancia Basin, Lake Meinzer (which was smaller than Lake Willard) formed at about B.C. 2000 and became desiccated shortly before B.C. 1000. Irwin-Williams (n.d.) suggests that the period between B.C. 2500 and B.C. 300 was characterized by greater effective moisture than at present, with a minor unconformity indicating less effective moisture at about B.C. 500 (Irwin-Williams n.d.: 5-6).

It is evident that our understanding of the climatic conditions prevailing during a period of major culture change is inadequately understood, and that, at this time, any arguments which relate the adoption of agriculture to climatic change are insufficiently documented.

ARCHAIC POPULATIONS

Knowledge of changes in population size and density during the Archaic is based on 1) numbers of sites which can be assigned to a particular phase, 2) the size of these sites, and 3) features present at sites, such as numbers of hearths, houses, etc. It should be obvious from the summary of the chronology of the Archaic that we cannot have a high level of confidence in interpretations based on these sources of information. The basic reasons for this judgement are that 1) few of the numerous "possibly" Archaic sites can be assigned to a particular phase because they lack diagnostic artifacts. (This is the "lithic scatter" problem.) 2) The phases themselves represent considerable periods of time, so that, for example,

1,000 years may separate two Jay Phase sites. 3) The numbers of features present at a site (particularly open sites) may represent successive reoccupations by relatively small groups of people rather than a single occupation by a larger group.

No studies of demographic changes in the Archaic have been attempted in the study area though Irwin-Williams (1973) does indicate relative population changes for Arroyo Cuervo, and she is aware of the problems mentioned above. The specifics of her study will not be treated here, but, in general, she finds evidence of gradually increasing population throughout the Archaic. This may well be true. It may also be a reflection of the higher probability associated with finding sites as time depth decreases. (There has been less time for geological processes to obscure remains.) It should be noted that recently some archeologists have developed models for estimating relative population density (e.g., Zubrow 1971, Plog 1974). These models generally depend on estimating the carrying capacity of various microregions, but without the fine grained climatological data necessary to reconstruct past micro-environments, the approach is not reasonable for the Archaic at present.

ARCHAIC SUBSISTENCE

Two approaches have been utilized to elucidate the economy of Archaic populations: 1) analysis of food remains where these are preserved (admittedly rare), and 2) interpretations based on the locations of sites with respect to potential resources. The latter procedure includes examination of the artifact assemblage of the sites from a functional perspective, if this is possible. The first approach, which generally requires the protective environment of a rock shelter, would provide the more unambiguous evidence. One note of caution with respect to remains from rock shelters should be given, however. Rock shelters may represent the loci of seasonal activities or other special uses and therefore may not contain the entire range of foods utilized by Archaic groups. The second approach requires both sophisticated knowledge of which resources would have been available at particular loci as well as unambiguous interpretation of artifact function. Given the available data

(both paleoenvironmental and archeological), interpretations based on the second approach must be considered highly tentative.

Data relevant to understanding the economic base of early Archaic groups are virtually non-existent within the study area, and limited elsewhere in the Southwest. The Pigeon Cliffs "Clayton Horizon" (which may possibly be early Archaic) yielded disarticulated bison bones along with an Archaic artifact inventory (Steen 1955). Irwin-Williams (1973: 5-6, and n.d.: 35) notes that in the Arroyo Cuervo area, the limited faunal assemblage consists largely of the remains of medium and small-sized game animals. Her interpretation of the Early Archaic economic base is largely dependent on the second approach mentioned above (viz. an examination of site locations and the artifact assemblages associated with specific loci). She notes that Jay Phase sites comprise base camps and small limited activity sites. The base camps are "uniformly located in the very favorable environment represented by the canyon-head complex, while the position of the latter depends upon their focus on hunting (sites located near ephemeral ponds or in the higher mountains), generalized foraging (sites located on the low mesa), or quarrying (mountain obsidian quarries)" (Irwin-Williams n.d.: 25). Further, base camps are relatively small and appear to represent repeated returns to the same locality, but show no seasonal differentiation. The Bajada Phase settlement system is regarded as basically similar in the Arroyo Cuervo area (Irwin-Williams n.d.: 26). Lang (1977: 14) notes that Early Archaic occupation in the Galisteo Basin is sparse, but suggests a pattern similar to that described for Arroyo Cuervo. (It should be noted that Lang (1977a: 14) considers the La Bolsa site to be Bajada Phase rather than Jay because it contains cobble tools which are more common during the Bajada Phase, despite the fact that projectile point morphology would indicate Jay Phase. It is also possible that the site continued to be used for a rather long period of time, spanning both phases.)

It is not known whether the Taos area sites, Chiflo (Ansalone 1971) and Garrapata Ridge (Rule 1973, Hume 1974) date to the Early Archaic. Site 54 (Rule 1973) apparently represents a workshop area,

selected on the basis of outcrops of volcanic material. However, Hume (1973) reports the presence of both base camps and limited activity areas on Garrapata Ridge. If her continued work does demonstrate base camps of an Early Archaic date, it should be noted that the high ridge does not conform to the canyon head location which Irwin-Williams suggests was selected for base camps in the Arroyo Cuervo area. The San Jose Phase sites at Arroyo Cuervo preserve the same distributional pattern; however, a few ephemeral pond-edge hunting sites have been noted, and an especially large hunting camp produced 15 hearths (Irwin-Williams 1973; n.d.: 35). One wonders if the determination of the function of this site as a hunting camp had to do with the artifact inventory or its relatively high elevation. In the Galisteo Basin Lang (1977a) notes a San Jose base camp on Galisteo Creek proper and a San Jose site in the San Cristobal drainage which "appears to have functioned as a temporary warm-season base for microbands engaged in mixed foraging activities" (Lang 1977a: 15). The latter site is located near the grassland-woodland ecotone. Another site, within the woodland zone, was considered a warm-season hunting camp, while two sites at lower elevations in pinyon-juniper suggest cool season hunting loci. Therefore, Lang (1977a: 16) proposes a seasonal upslope-downslope movement of San Jose Phase microbands focused on the movement of deer populations. Seasonal movements within a prescribed range (referred to as transhumance) is also reflected by the faunal and botanical assemblage recovered at Fresnel Rock Shelter, south of the study area in the Tularosa Basin (Hueco Complex) (Robert K. Hitchcock, personal communication 1977). Schaafsma's work in the Abiquiu reservoir district indicates a long period of late Archaic utilization of river terrace areas. Since the Abiquiu Reservoir sites do not seem to differ functionally, Schaafsma suggests that they represent one aspect of a seasonal round, the complementary seasonal activities perhaps occurring at higher elevations (Schaafsma 1976). Wendorf and Miller (1959) remark the occurrence of a number of late Archaic sites at high elevations in the southern Sangre de Cristos, but not enough information is provided to evaluate the type of activities these might represent. Although the limited data are suggestive of trans-

humane in the middle and Late Archaic, further attention should be given to delimiting the full range of occurrence of Archaic materials. The importance in documenting transhumance (or other regular patterns of Archaic loci) lies in being able to better define the scheduling activities of Archaic groups both before and after the introduction of agriculture. Whatever pattern was practiced prior to the use of cultigens would have had to have been interrupted, at least briefly, twice during the year for the activities involved in planting and harvesting. If these activities were of minimal economic importance, or if they might have been performed by only a few members of local groups, supplementary use of cultigens could easily have been integrated into the Archaic pattern. If, on the other hand, the activities were critical to the subsistence base and/or required large numbers of people, the planting of cultigens would have to be demonstrably related to some other critical group need (such as minimizing economic insecurity due to the unpredictability of some resources).

Limited maize agriculture was incorporated during the Armijo Phase in the Arroyo Cuervo region. Although there is continuity in settlement pattern, Irwin-Williams (1973) notes a new settlement type - camps representing large seasonal population aggregates. This site type was documented at the Armijo rock shelter, a cliff base site near a canyon head spring (Irwin-Williams n.d.: 37). According to paleobotanical and hydrological evidence, she considers the aggregation to have occurred in the fall-winter season, perhaps permitted by small amounts of agricultural produce coinciding with the period of maximum productivity of natural resources (Irwin-Williams n.d.: 38).

The Oshara Tradition, according to Lang (1977) was "truncated" in the Galisteo Basin; the area was abandoned by Oshara peoples and subsequently, used by peoples affiliated with the Chiricahua Phase and San Pedro Phase Cochise. The Chiricahua Phase is represented by a single site, which is functionally like the mixed foraging sites on the San Jose-Armijo Phases, but it is at a lower elevation, contains a relatively great number of chopping tools (which Lang relates to cactus processing), and shows a decline in use of Jemez Mountain obsidian and reliance on locally available chert (Lang 1977a:

17-18). The San Pedro Phase is represented by an increase in the number of sites in the San Cristobal area, apparently consisting of hunting stations located in the grassland-woodland ecotone area. The following developments in the Galisteo Basin are included within the Basketmaker II Basketmaker III categories. Basketmaker II is indicated by a large cool season foraging camp in a well-watered canyon tributary of San Cristobal Arroyo and numerous but small "hunting stations." A relatively large base camp containing hearths and earth ovens, located on Galisteo Creek, has been radiocarbon dated to A.D. 255 \pm 140, suggesting Basketmaker II occupation. The "terminal Archaic of Basketmaker III" in the Galisteo Basin is represented by warm-season cliff-top camps over-looking potential agricultural land along San Cristobal Canyon (Lang 1977a: 20).

DISCUSSION

In terms of culture history, a major problem that seems to be developing for the study area involves definition of a "Cochise intrusion," and its relation to the spread of agriculture. From a broad perspective, it must be remembered that southern Arizona, New Mexico and northern Mexico are encompassed within the same general culture area. North American southwestern archeologists generally view this area as "a southern periphery." Archeologists with experience in modern Mexico tend to regard the entire Southwest as "the northern periphery" (or Gran Chichimeca). The domestication of corn took place far to the south in that part of Mexico properly viewed as part of the Mesoamerican culture area, well documented in the Tehuacan Valley, of Puebla and Oaxaca (MacNeish 1971), and possibly independently in the Valley of Mexico, near modern Mexico City (Robert Santly, personal communication 1978). In Mesoamerica, sedentary communities, and indeed large towns, predate the acceptance of corn in the Cochise and Oshara Anasazi areas. In the latter areas, maize agricultural technology differs substantially from that associated with maize in Mesoamerica. For example, in the Southwest, maize processing involved grinding dried corn on a milling slab, or roasting fresh ears of corn and then grinding the roasted kernels. This contrasts with the Mesoamerican pattern of soaking corn kernels in a lime

solution prior to crushing. Thus, one should not envision an invasion of peoples from Mexico bringing agriculture to the Southwest. Nevertheless, the relationship with Mesoamerica, as distant as it is, may be important to the theoretical arguments of population disequilibrium. Because sedentary communities and towns existed early in Mesoamerica, it seems likely that eventually overflow population from this source could have placed pressure on the Cochise and Oshara peoples of the Southwest. The fact that maize was not accepted earlier may have been the result of three factors: 1) the ability of Mesoamerican agriculture to expand within Mesoamerica first and produce surpluses which could (and apparently did) support large dense populations before impinging on the northern frontier, 2) the possibility that early varieties of Mesoamerican maize could not be cultivated in the arid Cochise and Oshara areas, 3) continued low population densities and relative abundance of wild plant foods and game in the Southwest.

If we accept the notion that demographic pressure is directly related to technological change, one would expect this pressure and the concomitant technological change to be felt first in those areas which provide the least amount of reliable resources. The included maps of rainfall and vegetation indicate that compared with other areas of the North American Southwest, the northern sector (the Oshara area) is relatively favorable. Therefore it is

reasonable to expect that the acceptance of agriculture and dependence on agriculture should be relatively later, as in fact it appears to have been.

The above argument, of course, is highly speculative. We still have no reliable demographic estimates for the Archaic in the study area or elsewhere, nor do we have detailed knowledge of the Archaic economic base and the scheduling adjustments which might have been made to incorporate maize and other cultigens. These data must be seen as critical needs within the study area.

One exceptionally strong caveat with respect to future studies of Archaic materials in the study area is important. As noted, Archaic artifacts often exist as surficial deposits, particularly in areas deflated through wind erosion. If we are to pursue the detailed environmental and paleoenvironmental studies that I have indicated are of primary importance in order to elucidate the Archaic subsistence pattern, precise recording of the locations of these sites (in terms of quality of soils, vegetative diversity, etc.) is essential. When surficial artifacts are picked up in the course of survey, all context is lost. In effect the entire site has been collected, and there is nothing left to study. I therefore urge that, unless there are very good research reasons for the collection of Archaic material, a non-pickup strategy for all Archaic and "undifferentiated lithic scatters" be adopted.

ANASAZI PREHISTORY

TAOS AND CIMARRON DISTRICTS

In the preceding section it was remarked that Archaic materials occur in both the Taos and Cimarron areas. Early Anasazi communities, however, have been described for the Cimarron area only. Glassow (1972) refers to the Basketmaker II manifestations in the Cimarron as the Vermejo Phase (see Table 3 for phase correlations). One radiocarbon date of A.D. 510 (1460 \pm 50 B.P.) has been obtained from a Vermejo Phase site in the Middle Ponil drainage.

The Vermejo Phase is characterized by circular stone houses built on the bluffs above the canyon floors. Neither storage facilities of ceramics are present at these sites. The projectile points found are less than 1.6 cm in length and grinding slabs are more common than metates, but corn has been recovered. It has been suggested that this phase in the Cimarron may represent a seasonal occupation of the area, possibly during the winter (Glassow 1972, Kirkpatrick 1976a, Kirkpatrick and Ford 1977).

Table 3 Correlation of Phase Designations Used in the Study Area

Date A.D.	Pecos Classification	Rio Grande Sequence*	Taos Area**	Cimarron Area***
1900				
1800	Pueblo V			
1700		Historic		Jicarilla
1600				Cojo (Non-Pueblo)
1500	Pueblo IV			
1400		Classic		
1300			Talpa	
1200	Pueblo III	Coalition		Cimarron
1100			Pot Creek	Ponil
1000	Pueblo II		Valdez	Escutitores
900				
800	Pueblo I			
700		Develop- mental		
600	Basketmaker III			
500				Pedregoso
400	Basketmaker II	Pre-Ceramic		Vermejo

*After Wendorf and Reed 1955

**After Wetherington 1968

***After Glassow 1972

The succeeding Basketmaker III period in the Cimarron has been termed the Pedrogosa Phase (Glassow 1972). Four radiocarbon determinations date the phase to about A.D. 750, and it is considered to have lasted until about A.D. 900. The Pedrogosa Phase is best documented at one component (the east component) of the North Ponil 1 site, which is in a valley floor setting, against sandstone outcrops of the Poison Canyon formation. This site yielded several varieties of firepits, underground bottle-shaped cists, roasting ovens of various sizes, a broad activity area, at least two shallow pithouses and a large, dense scatter of fire-cracked rock. The artifact inventory included about a dozen plain thick pot sherds, and open end trough metates and grinding slabs (Glassow 1972: 80, Kirkpatrick and Ford 1977). It is significant for the following discussion that ceramics present in the Pedrogosa Phase, are not painted wares either traded into the area or apparently made in imitation of specific ceramic wares from outside the area. Botanical remains from the Pedrogosa Phase component at North Ponil 1 include both corn (a chapalote derivative) and beans, as well as a variety of commensals and edible nuts and berries. Both the corn and beans show considerable variability; this has been interpreted as the result of climatic conditions, variable genetic stock, and/or poor field maintenance (Kirkpatrick and Ford 1977).

The dating of the subsequent Escritores Phase in the Cimarron area, and the approximately contemporary Valdez Phase in the Taos District (Wetherington 1964, Green 1976, Loose 1974) is not well documented, because it depends on ceramic cross-dating with a poorly defined and variable type of mineral painted black-on-white ware. In part because ceramic classification of locally produced black-on-white wares is an omnipresent difficulty in the Rio Grande area, the particular problem manifest in the Taos District is discussed in detail here. Glassow assigns the Cimarron Escritores Phase to between 900 and 1100, based on the presence of "Kiatuthlanna or Red-mesa-like Black-on-white sherds" (Glassow 1972: 80). In describing the eight Valdez Phase pithouse sites excavated near Arroyo Hondo, Loose (1974) concludes that all the sites date to the Valdez Phase on the basis of the culinary sherds present, but notes that

"significant amounts of Red Mesa B/W" occur (Loose 1974: 33). Unfortunately, "unidentified B/W sherds" are reported for the Arroyo Hondo sites as well (Loose 1974: Table 4). Wetherington (1964: 100) notes that the published distinctions between Kwahe'e Black-on-white and Taos Black-on-white both presumed to be derivative of Mera's (1935) Chaco II wares including Red Mesa Black-on-white and Escavada Black-on-white are ambiguous but he retains Taos Black-on-white as a type. Green (1976: 63) characterizes the Valdez Phase by the "exclusive occurrence of" Kwahe'e B/W: Taos Variety (formerly Taos B/W), Taos Neckbanded, Taos Incised and Taos Plain Gray." Further, she states that Kwahe'e B/W: Taos variety "is presumed to have been approximately contemporary with the Tesuque variety . . . which is indigenous to the Santa Fe area, and has been dated by dendrochronology to ca. A.D. 900 through 1200" (Green 1976: 63).

Mera (1935) and presumably Peckham and Reed (1963) view Rio Grande Black-on-white ceramics as local copies of Chacoan types that date to Pueblo II (ca. 900-1100) in the San Juan. The general assumption, inherent in the interpretations, given above, seems to be that derived types will "crystallize" at about the same rate, as though there were a standard rate of attribute drift among ceramics. The interpretive framework is genetic. This is not only logically absurd, but the earliest date thus far reported for the Taos Valdez Phase pithouse is an archeomagnetic date of 1190 ± 20 for TA 34, a pithouse reported first by Herold and Luebben (1968) (Eighmy 1978). Of the Valdez Phase sites from the Arroyo Hondo area, which might be earlier, a single archaeomagnetic date of A.D. 1120 was obtained from a surface structure at LA 9205 (Loose 1974). Although Loose maintains that Red Mesa sherds do occur in the Arroyo Hondo sites, Brody (personal communication 1978) has suggested that the sherds are "generically" Red Mesa rather than typical. Based on the discussion above, it is clear that the Valdez Phase of the Taos District and the Escritores Phase of the Cimarron are in no sense adequately dated. I would suggest that, as a minimum, all reputed Red Mesa and Red Mesa-like sherds in current collections be examined petrographically, and that tree-ring dates for pithouses in the Taos area be obtained where possible.

It should be noted in this regard that a number of tree-ring specimens from the Arroyo Hondo Valdez Phase sites were sent to the Tree-Ring Lab at the University of Arizona, but processing was not arranged for.

Although no complete, systematic, inventory survey has ever been made in the Taos area, Valdez Phase sites have been located in the following situations: the mountainous areas above the Taos Valley, on terraces and benches adjacent to permanent streams, on ridges or higher benches near tributaries of permanent streams, and on relatively flat alluvial terraces. Valdez Phase structures have been found above 7,750 feet (Morenon, Henderson and Nielson 1976).

Excavated Valdez Phase sites generally consist of small groups of relatively deep pithouses (usually over 8 feet in depth), some with associated surface work areas and some with surface rooms. Pithouse walls are of unplastered earth, plastered earth or puddled or coursed adobe. Both four post and two post roof supports are reported. Pithouse shape varies from round to rectangular. Interior firepits are either round or rectangular and about half have raised adobe rims. An ashpit/damper/firepit complex is frequently present, and ventilators, when observed, are oriented east. Escritores Phase sites from the Cimarron consist of small groups of circular pithouses with four post roof supports, collared firepits and east-oriented ventilators (Loose 1974, Wetherington 1964, Blumenschein 1958, Green 1976, Kirkpatrick 1976a, 1976b).

No quantitative data are available for either cultigens or wild plant or animal food during the Valdez Phase. Green (1976) comments that numerous artifacts made on the bones of deer and rabbits indicate that these animals were hunted. Raw material for ground and flaked stone artifacts include locally available sandstones, schists, quartzite, cherts and chalcedony. Both Green (1976) and Loose (1974) record the presence of some obsidian artifacts, and Green (1976) suggests that the nearest source of obsidian may have been the Jemez Mountains. Loose (1974: 37) notes that 214 complete, 58 fragmentary and 18 projectile point bases were recovered from the Arroyo Hondo Valdez Phase sites. In addition,

the point assemblage included three Jay points and an Eden base.

In the Cimarron area the Escritores Phase is followed by the Ponil Phase, for which ceramic cross-dating indicate a temporal duration of from A.D. 1100 to A.D. 1250. Most of the excavated sites in the Cimarron region are Ponil Phase manifestations. These include Box Canyon Rock Shelter, which was excavated in 1941 (Bogan 1946), the Slab House and Jacal Structure excavated by Lutes (1959), and Lizard Cave rock shelter (Skinner 1964, Kirkpatrick 1976b). Ceramic assemblages from Ponil Phase sites include both Taos Incised and Taos Punctate; Santa Fe Black-on-white is absent. It is generally assumed that the Taos wares were traded into the area rather than locally produced. The emphasis on rock shelter excavation has provided a great number of perishable artifacts such as willow shoot mats, wooden gaming pieces, and yucca objects (Skinner 1965, Kirkpatrick 1976b). Lutes (1959) notes an abundance of projectile points and a diversity of lithic raw material not available locally. Masonry structures, where present, are dry wall and have slab floors. There is reasonable doubt as to whether or not the Ponil Phase is most closely affiliated with the Rio Grande area or with the Plains. Lutes (1959) suggests that Rio Grande affiliation is indicated by the masonry houses, sandals, basketry, straight pipes and the ceramic trade wares. On the other hand, the Ponil Phase is distinguished from Anasazi manifestations by the absence of cranial deformation, stone axes, and kivas. Although corn has been recovered from Ponil Phase sites, the number and diversity of projectile points as well as numerous faunal remains seem to indicate a greater emphasis on hunting than supposedly characterizes Anasazi adaptation (Lutes 1959).

In the Taos District, the Pot Creek Phase is dated between A.D. 1200 and A.D. 1250. The dating is based on the presence of Santa Fe Black-on-white and a limited number of tree-ring dates. Santa Fe Black-on-white is clearly distinguishable among the Rio Grande black-on-white wares. It is a carbon painted ware and has been tree-ring dated at numerous sites in the Santa Fe River area and on the Pajarito Plateau. Breternitz (1966) gives A.D. 1200 to A.D. 1350 as its best dates. Within the Taos District, Wetherington

(1964) characterizes the Pot Creek Phase as a period during which population aggregated into multi-family surface pueblos. He views this development as the result of increasing population in the area, primarily coming from the Santa Fe District to the south (Wetherington 1964: 162). The Phase is actually known from only three excavated sites; portions of Pot Creek Pueblo, TA-26, and probably the Llano Site (L.A. 1892). Pot Creek Pueblo is a large, multi-component site at an elevation of 7,200 feet in a valley setting among the Tres Ritos Hills southeast of Taos. Most of the excavated structures at Pot Creek Pueblo relate to the later, Talpa Phase. However, four rooms, a kiva and two occupation "areas" found beneath Talpa Phase rooms were assigned to the Pot Creek Phase. The rooms lacked the central post-basin complex characteristic of the later Talpa Phase. The Pot Creek Phase kiva contained an ashpit-deflector-firepit complex, characteristic of Valdez Phase pithouses, but contained five roof support posts and a tri-level floor drum typical of later, Talpa Phase kivas (Wetherington 1964: 79-81).

TA-26 (Vickery 1969) is a small, 8-room pueblo with an associated plaza and kiva, located at an elevation of 7,420 feet in the same general area as Pot Creek Pueblo. Rooms were constructed of coursed adobe, and lacked central basins, firepits and hearths. Interior room features comprised unburned basins and a central post roof support. The kiva contained sub-floor channels, like those described for the Pot Creek Phase kiva at Pot Creek Pueblo, and a central firepit/ashpit/deflector complex. A single tree-ring date of A.D. 1207 was obtained. Vickery dates the occupation of the site to from A.D. 1190 to A.D. 1250 on the basis of the tree-ring date, ceramics, and architectural details. Although most of the decorated ceramics were Santa Fe Black-on-white, a few Talpa Black-on-white sherds were recovered. Vickery suggests that TA-26 may have been abandoned at about the time that Pot Creek Pueblo was undergoing architectural expansion during the Talpa Phase. A diversity of bird and mammal bones recovered from TA-26 were identified by the investigator (Vickery 1969: 68). She also notes that both trough and flat metates were recovered. TA-26 also yielded a trinotched axe which is reported for the Valdez Phase by Green (1976) and also known to occur

in the Gallina Phase (A.D. 1100 to A.D. 1250) in the Gallina District, west of the Rio Grande.

The Llano site was excavated by Jeancon in 1920 (Jeancon 1929). Considering the apparent absence of central basins within rooms, the details of adobe construction, etc. Wetherington (1964: 160) thinks that Llano probably belongs within the Pot Creek Phase. It is, of course, difficult to evaluate Jeancon's ceramic descriptions, because they were written before much information on the ceramics of the area was available.

Surveys in the Taos District (Blumenschein 1956, 1958, Herold 1968) report numerous "unit pueblos" in the Arroyo Hondo, Arroyo Miranda, Rio Grande de Ranchos area which may relate to the Pot Creek Phase, but which have not been tested or excavated.

In the Cimarron area, Santa Fe Black-on-white ceramics are associated with the Cimarron Phase, which is considered the final phase related to Puebloan occupation of the area. A date of A.D. 1100 through A.D. 1300 is proposed for this phase on the basis of ceramic-cross dating, in this case with the presence of Santa Fe Black-on-white. Cimarron Plain, neckbanded, incised and punctate types are also associated with Cimarron Phase sites (Glassow 1972, Kirkpatrick 1976b). Based on the dates for Santa Fe Black-on-white (Breternitz 1966), A.D. 1100 would seem too early a beginning date for the Cimarron Phase, and independent methods of dating should be applied. The final date of A.D. 1300 for the phase does not seem unreasonable, in light of the abandonment of many small sites in the Taos District and the concomitant aggregation at about that time. Cimarron Phase sites generally consist of small, multi-room surface pueblos with coursed adobe or rock masonry walls. They are generally located on the lower portion of Ponil Creek and along the Cimarron River (Glassow 1972: 81; Kirkpatrick 1976a, 1976b). Sites in the Watrous area (Lister 1948) may also relate to the Cimarron Phase. In addition to the puebloan house types and ceramics, Cimarron Phase sites have yielded a variety of lithics, including Plains style snub-nosed end-scrapers. Gunnerson (1959) suggested that these items may have been traded in from the Plains. In any

case, the two succeeding phases identified in the Cimarron area (the Cojo Phase and the Jicarilla Phase) seem to reflect the general Plains traditions and are not related to Anasazi developments (Kirkpatrick 1976a, Gunnerson 1959: 45-6; Wendorf 1960).

Pot Creek Pueblo continued to be inhabited, and even increased in size during the Talpa Phase, which Wetherington (1964) dates to from A.D. 1250 to A.D. 1350. This continuity is obscured in Ellis' categorization of Taos prehistory (Ellis 1974a). Ellis considers Taos District chronology in terms of three "complexes." Her Complex I dates between A.D. 900 and A.D. 1300 and is characterized by influence from the Chaco area (in terms of ceramics) and numerous archeological sites. Complex II dates between A.D. 1300 and A.D. 1600 and is marked by a shift away from Chaco influences and closer relationships with the Santa Fe area. Her Complex III dates from A.D. 1600 to the present, as represented by Taos and Picuris pueblos. Ellis' view is most concisely expressed in the following:

Complex I represents the northeast extension of the widespread Chacoan culture, other manifestations of which cover Pueblo 2 in the Santa Fe area, in the Chaco-Red Mesa area, and in the Cebolleta region near Acoma. The carriers of this culture disappeared out of the Taos district about the time the carriers of Complex II came in. As Complex II, tied by ceramic relationships to the Galisteo and Santa Fe areas, is that found to precede and be directly ancestral to Complex III in the Cornfield site [ancestral Taos] and Taos Pueblo trash mound. The newcomers would appear to have been Taos ancestors (Ellis 1974a: 34).

Wetherington (1964) emphasizes continuity rather than migrations. As discussed above, his Pot Creek Phase is related to the introduction of Santa Fe Black-on-white, but there is also architectural retention of Valdez Phase traits and general continuity in the entire ceramic inventory, especially in the utility wares. Further, Pot Creek Pueblo evidences lack of interruption between the Pot Creek and Talpa Phases in both ceramic and architectural features. It should be remarked that

Ellis (1974a) considers the abandonment of Valdez Phase sites as a movement out of the area, whereas Wetherington (1964) relates the phenomenon to the differential distribution of the population through aggregation of people at large sites such as Pot Creek Pueblo and historic Old Picuris.

The Talpa Phase, which Wetherington dates to from A.D. 1250 to A.D. 1350 shows retention of some Santa Fe Black-on-white and Taos Black-on-white and the introduction of a number of new ceramic types at Pot Creek Pueblo. The new types include Talpa Black-on-white (this type is referred to as Taos-Poge Black-on-white by Ellis and Brody 1964) which although it was present in minor amounts during the preceding phase, becomes dominant. As noted above, most of the excavated structures at Pot Creek Pueblo relate to the Talpa Phase. Multi-story construction was common, although coursed adobe continued to be used. Most rooms had central roof support posts set within a central basin (Wetherington 1964: 26). The same rather unusual architectural feature has been documented at both Old Picuris Pueblo (Dick 1965; Holschlag 1975) and at Cornfield Taos (cf. Ellis and Brody 1964, Wetherington 1966, 1968). At both Old Picuris and Pot Creek Pueblo, kivas were large (ca. 12m diameter), subterranean, circular structures with coursed adobe walls. Interior floor features included square to rectangular stone lined hearths without ashpits, foot drums and 6 to 8 roof support posts (Holschlag 1975). The differences between the Picuris kiva and the Pot Creek Pueblo kiva are primarily in the presence at Picuris of a subsidiary west ventilator, a north oriented slab lined and slab covered sub-floor channel and numerous prayer plume holes all of which are absent at Pot Creek (Holschlag 1975: 58). Sipapus are absent at modern Taos, Picuris and Pot Creek Pueblo kivas (Parsons 1936, Dick 1965, Holschlag 1975).

Pot Creek Pueblo was abandoned at the end of the Talpa Phase. Wetherington (1964: 82-84) believes the abandonment occurred at about A.D. 1350, because neither Biscuit A or Glaze ceramics were found at Pot Creek Pueblo. Wetherington (1964: 82) suggests that the inhabitants moved to Picuris. Evidence cited in recent Taos' land claims cases (Ellis 1974a) indicates that some of the people from Pot Creek Pueblo may also have settled at

Taos. In any case, the designation Vadito Phase has been applied to the period from A.D. 1375 to A.D. 1490 and is known from excavations at Old Picuris (Dick 1975) and Cornfield Taos (Ellis and Brody 1964, Ellis 1974). At Old Picuris the Talpa Phase pueblo was apparently levelled and the Vadito Phase pueblo constructed over the debris in the same architectural tradition. The major differences between the Talpa Phase and Vadito Phase constructions at Old Picuris are: first, that the central basins in ground floor rooms are deeper and wider in the Vadito Phase, and are more appropriately termed cists, because according to Picuris' informants they were used for storing corn (Dick 1965, Wetherington 1966:20); second, only small, circular subterranean kivas (5-6 m in diameter) were constructed. The kivas contained all the floor features noted for the Talpa Phase, however and they lack sipapus. There is some confusion surrounding the terminology applied to the ceramic inventory of the Vadito Phase. As noted, Ellis and Brody (1964) referred to the carbon painted Black-on-white as Taos-Poge B/w, and Brody later identified it as Talpa Black-on-white (Wetherington 1968: 57). On the basis of rim form, Dick (1965: 133) distinguishes Talpa B/w from Taos-Poge B/w and considers the latter within the range of his Vadito B/w as defined at Old Picuris. The available descriptions indicate, the three "types" would seem to be exceptionally difficult to distinguish; especially since they are roughly contemporary, there seems to be no particular reason not to view them as variants of the same type. In addition to this local Black-on-white ware, the ceramic inventory of the Vadito Phase includes Tewa Polychromes, polished black (at Taos), and both plain and smeared indented corrugated culinary wares. Glaze wares occur as trade ceramics. It should be noted that Holschlag (1975) regards the earlier levels of the Taos Cornfield site as related to the Vadito Phase rather than the Talpa Phase. Her reasons are twofold. First, she accepts Dick's (1965: 133) inclusion of Taos-Poge Black-on-white in the Vadito type. More importantly, she notes that the dimensions of the single basin structure encountered by Ellis and Brody (1964) in their tests at Taos Cornfield are closer in dimensions to the Vadito Phase "cists" than to Talpa Phase basins. But, since neither the terminal date of the occupation of Pot Creek Pueblo or the

founding date for Taos Cornfield are precisely established, it makes little difference which phase designation is used. In addition to the occupations at Cornfield Taos and Old Picuris during the Vadito Phase, Ellis (1974a: 62-76) reports 11 sites in the Taos District that, on the basis of surface ceramics, would be contemporary with the Vadito Phase. These are distributed from Arroyo Hondo to Ranchos de Taos and Talpa. Two seem worthy of note. Ellis' (1974a: 69) site 27 is a very large site, first described by Jeancon (1929). The site is opposite the town of Talpa, overlooking the west bank of the Rio Grande de Ranchos. Site, 45 (Ellis 1974a: 73) situated at Ponce de Leon Springs, is said to be the ancestral village of the Feather Clan at Taos. Because of its size and ceramic assemblage, site 27 may represent a village ancestral to modern Taos as well.

Although the later prehistory at Picuris has been divided into a number of Phases (Dick 1965, Holschlag 1975), it is more convenient to group these and discuss them in terms of historically recorded events. Between A.D. 1490 and A.D. 1600, there was a general deterioration in houses at Old Picuris. The Pueblo was first visited by the Spaniard Castano de Sosa in 1581. The first Picuris Mission, San Lorenzo, was established by Fray Martin de Arvide in 1621, and four successive churches were built between 1706 and 1776. Between 1696 and 1706, the Pueblo was largely abandoned, the inhabitants having moved to the Plains with the Apache. In 1706, the Picuris returned and the modern Picuris Pueblo was constructed, although rooms in Old Picuris continued to be used occasionally as stables. Occupation of the site has been continuous since then.

As part of the land claims action of Taos Pueblo, Ellis and Brody (1964) were permitted to trench one location at Cornfield Taos and one location in "Mound III," supposedly the oldest trash mound in modern Taos. Although the data provided by these excavations are limited, they are the only information available for a chronology of the founding of Taos. Cornfield Taos, the site of the old pueblo, is located about $\frac{1}{4}$ mile northeast of Taos church. Ellis and Brody (1964) and Ellis (1974) place the beginning of occupation at about A.D. 1300 to 1350 and its abandonment at

about A.D. 1400 or 1450, when modern Taos Pueblo seems to have been founded. Although Cornfield Taos reputedly was burned during the Pueblo Revolt, Ellis and Brody (1964) found no evidence of burning in their excavation, and no discontinuity was discovered in the ceramic assemblage between the upper levels of the Cornfield Taos trench and the lower levels of the trench in Mound III. Taos Pueblo was first mentioned by the Spaniard Hernando de Alvarado in 1540, although there is doubt as to whether or not he actually saw the village. Fray Francisco de Zamora was assigned to Taos in 1598, and the first Church constructed early in the 1600's. In 1639, the Taos people revolted and fled to Cuartelejo with the Plains Apaches. They returned in 1662, and a new church was built. The pueblo appears to have been abandoned during the Pueblo Revolt; De Vargas found it deserted in 1694, and his men sacked the village. Taos was eventually re-inhabited and has been occupied continuously since.

Recent surveys by Nemaric (1975) and Gauthier et al. (1978) on the Picuris Reservation have recorded 14 rather complex agricultural sites consisting of grid systems and linear borders and terrace systems on benches surrounding major drainages. Evidence of diversion ditches and other devices specifically related to water control is lacking at these sites. Gauthier et al. note that ceramic evidence indicates that these features were utilized "during Taos B/W and Santa Fe B/W times (ca. A.D. 1100 to 1325) and early historic times (ca. A.D. 1650)" (Gauthier et al. 1978: 18). These observations indicate that considerable energy expenditure may have been necessary for intensive horticulture in the Picuris area, and that this may have had more to do with problems of erosion than lack of moisture. The relatively dense tree cover in the Taos district, combined with this evidence, might indicate that as soon as land was cleared for crops, erosion would have been a considerable problem. Given the labor requirements of constructing up to 1.1 square miles of grid gardens and linear border gardens (Nemaric 1975), it would seem that if hunting and gathering were at all a viable strategy, horticulture would be a last resort. Certainly, further investigations of the diversity of agricultural technology in the area should be pursued. In historic times, both Taos and Picuris

Pueblos have had considerable interaction with Plains groups (the most well-known situation being the annual trade fairs held at Taos). It would appear from the documented intensity of this interaction that neither group might have been entirely self-sufficient economically without the other.

As discussed in the preceeding chapter, attempts at correlating various ceramic and architectural manifestations with particular modern linguistic groups has been a major preoccupation of Rio Grande prehistory. Those that include information which relate specifically to the northern Tiwa of the Taos District are those of Mera (1935), Reed (1940), Wendorf and Reed (1955), Ellis (1967) and Ford, Schroeder and Peckham (1972). Although not as intensive, similar literature related to Plains and Athapaskan speakers in the area include Gunnerson (1960, 1969), Hammack (1964), Hill and Metcalf (1941), Lange (1953), Montgomery (1963), Schaafsma (1978), Schroeder (1960) and Wendorf (1960). By and large, these attempts operate on the assumption that particular traits, especially ceramic types, may be identified with specific language groups. Not only is such an assumption untested, but certain ethnographic examples indicate that it is unwarranted in any case. Rather than pursue this seemingly non-productive line of inquiry, I would suggest that the Taos District provides suitable archeological data for monitoring the degree of variability in artifactual and architectural remains known to be of protohistoric and historic northern Tiwa origin. Preliminary work along the lines advocated here has been done by Holschlag (1975), who documents a change from predominance of extended family households to nuclear family households during the last 600 years in the northern Tiwa area despite continuity in specific architectural features and ceramic inventory. Although the reason or reasons for the shift in household size are not known, testing of explanatory hypothesis depend, in part, on the precise dating of the change. For example, as Holschlag (1975: 134) suggests, if the "cultural reorganization took place shortly after the abandonment of Pot Creek Pueblo, then causal factors like environmental change, internal conflict, and disease must be considered." Otherwise, Spanish inducements and population decline as the result of introduced European diseases might

have been critical. If the change was even more recent, a response to the Anglo-American welfare system must be considered (cf. Bodine 1972).

Finally, in order to interpret, in a meaningful way, any of the adaptive changes made by the Northern Tiwa and the Plains and Apachean groups in the Taos and Cimarron Districts, much more specific information than is now available with respect to the subsistence technologies of these groups is essential, and most of our "assumptions" must be seriously questioned. For example, although corn is present in Valdez Phase pithouses and in the Vermejo Phase ruins of the Cimarron District, the diversity of edible, wild plant foods recovered at Pot Creek Pueblo, in addition to the abundance of one hand grinding stones reported (Holschlag 1975) provide some indication of the continuing importance of wild foods even when aggregated sedentary groups are established. It would seem that only with a realistic assessment of the subsistence requirements of groups in the Taos and Cimarron areas, can the effects of prehistoric or historic incursions into the area be understood.

THE ALBUQUERQUE DISTRICT

Although PaleoIndian and Archaic manifestations in the Albuquerque District were mentioned in the preceding chapter a brief discussion of some of the reported Archaic sites is given here, because the Albuquerque District seems to provide a fairly well-documented cultural continuum from Late Archaic through Basketmaker II and Pueblo I periods. Archaic sites have been reported from the area north and west of Albuquerque between the West Mesa and the San Ysidro area (Reinhart 1968, Snow 1974, Schaafsma 1968, 1973, Agogino and Hester 1953, Wiseman 1974, Beal 1976). The sites are generally located well above the Rio Grande flood plain on eroded surfaces cut by arroyos. Sand dune formations are a marked feature of the terrain. Although most sites occur as exposed surface deposits or in arroyo cuts (Agogino and Hester 1953), there are rock shelters which appear to have been used sporadically from Archaic through Anasai and Historic times (Beal 1976, Reinhart 1968). In view of Lang's (1977) contention that the Oshara tradition was truncated in the Galsiteo Basin, and Late Archaic materials in that area seemed more closely

affiliated with the Cochise tradition, an evaluation of the Archaic point types from the Albuquerque District would be particularly valuable. Unfortunately, the literature does not provide the necessary descriptive detail to do this. Points which resemble San Jose types of the Oshara Tradition are reported (Campbell and Ellis 1952, Agogino and Hester 1953) as are Cochise types (Reinhart 1968, Agogino and Hester 1953). Since both point types are generally considered Late Archaic, there seems to be little justification for viewing them as chronologically sequential. Rather, I suggest that the Albuquerque District offers an opportunity to define the range of variability in Archaic assemblages as a whole through consideration of point types, other stone tools and debitage.

Reinhart (1968, 1969) refers to Basketmaker II in the Albuquerque District as the Rio Rancho Phase; and relying on two radio-carbon dates, would date the phase to about B.C. 1000 to B.C. 1. BR-16 is considered the type site for this phase, and related materials have been recovered from Boca Negra cave and several surface sites west of Bernalillo. BR-16 was identified as a dwelling structure. Although a floor could not be recognized, 7 post-holes, heating and cooking pits, and storage cists comprised an occupational surface. Faunal remains included antelope, cottontail, jackrabbits and rodents. Ceramics are not present at these sites, but points resembling San Pedro Cochise types are reported, as are slab metates. Maize was not recovered at BR-16, but was found in Boca Negra Cave along with Rio Rancho Phase artifacts. Reinhart (1968: 53-55) believes that Rio Rancho phase utilization of the area west of Albuquerque may have been on a seasonal basis with faunal remains indicating, perhaps, late fall and early spring occupation.

Basketmaker III of the Albuquerque District is designated the Alameda Phase by Reinhart (1968), who proposed dates of between A.D. 1 and A.D. 500 for the manifestation. His interpretation is based on a single, admittedly unreliable, radio-carbon date of A.D. 32 ± 138 from BR-45, west of Bernalillo. He includes the Saint Joseph Site (Schorsch 1962), the Denison Site (Vivian and Clendenen 1965) and the Sedillo Site (Skinner 1965) within the Phase. On the basis of the ceramic inventories and architectural variability at these sites

and more recently excavated Basketmaker III sites in the District, I do not believe retention of the Phase designation is warranted. Rather, I will use the term Late Basketmaker-PI in recognition of the fact that there is an apparently gradual transition between Basketmaker III and Pueblo I. All of the sites included within this category were characterized by the presence of Lino Gray ceramics. Hawley (1936: 21) considers Lino Gray a diagnostic of Basketmaker III when it is not accompanied by Kana'a Black-on-white. Dates of A.D. 450 - A.D. 700 are generally accepted for Lino Gray. However, Kana'a Gray is associated with all of the sites mentioned above, and may date as late as A.D. 875 or 900 (Colton 1955). Dates for these types have been established in the Four Corners area, primarily. They are not securely dated in the Rio Grande, particularly in view of the fact that the examples for the Rio Grande appear to be locally manufactured (Oaks 1978). As a final caveat, Lino Gray and Kana'a Gray are distinguished solely on the basis of neck treatment, so that vessel body sherds are non-diagnostic.

At least some components of all of the sites mentioned above, as well as one of the two pithouses reported by Vytlačil and Brody (1958), Sites I, II, and four pithouses from Site III of the Artificial Leg sites in Corrales (Frisbie 1967), the Big Boulder Site (LA 14258) in Tijeras Canyon (Oaks 1978), and possibly, the as yet unreported LA 4955 near Bernalillo (excavated by David Keyser and discussed briefly by Wiseman 1976), lack Red Mesa B/w, are considered Late Basketmaker-Pueblo I here and probably date to before A.D. 900. A single archaeomagnetic date of A.D. 580 \pm 40 from one of the structures at Artificial Leg Site I has been reported (Frisbie 1967: 174). All of the sites mentioned, except for LA 4955, contain Lino Gray or both Lino Gray and Kana'a Gray and either Mogollon trade-wares (such as Alma Plain, and Alma Neck-banded) or gray wares with fugitive red paint. LA 4955 seemingly is anomalous in that the ceramic inventory consisted only of brownwares (Wiseman 1976). In addition to ceramics; basketry, matting, sandals, olivella shell beads, turquoise pendants, basin and slab metates, one hand manos and maize have been recovered from Late Basketmaker-Pueblo I contexts. At most sites, the only fauna identified

consist of both jackrabbits and cottontails; however, fauna from Artificial Leg sites I, II and III included turtle, quail, turkey, ground squirrel, pocket gopher, kangaroo and wood rats, beaver, canis, badger, elk, deer, antelope and mountain sheep (Frisbie 1967: 17-18); unidentified "large mammal" remains are reported for the Big Boulder Site (Oaks 1978).

From a cultural historical perspective, the two major problems identified for Late Basketmaker-Pueblo I in the Albuquerque District are: first, the lack of well-dated sites: second, the question of "cultural affiliation" of peoples in the area (whether Anasazi or Mogollon or some combination). The problem of adequate dating is likely to continue until more sites are excavated and radiocarbon dated. It should be noted that most wood recovered from the sites is cottonwood, which cannot be dated through dendrochronology. The second problem involves an evaluation of ideas concerning the origins of pit structures in the central and northern Rio Grande.

Pithouses, of course, are common to both the early Anasazi and the Mogollon. In both areas there was also a shift from pithouses to surface dwellings, although the shift is not contemporary when the Four Corners area is considered. Bullard (1962: 187) comments that the only "truly significant" features of pithouse architecture in the Mogollon area are central-post roof supports and gabled roofs. He lists the presence of antechambers, ventilators, benches, partitions, deflectors, ash pits and rounded clay fireplace coping as distinctive features of Anasazi pithouses prior to A.D. 900 (Bullard 1962: 174). None of the excavated pithouses in the Albuquerque District have central-post roof supports or gabled roofs. On the other hand, benches, partitions, and, in most cases, adobe or stone deflectors are absent as well. Oaks (1978) indicates that long lateral entries are characteristic of Mogollon pithouses, and except for the unusual LA 4955 (Wiseman 1976) are absent in the Albuquerque District. In general, Albuquerque District pithouses tend to be round or round with a slight concavity on the eastern side. Both interior, and, where noted, exterior storage cists occur. Floors, where present, are either hard packed clay or plastered, hearths are generally central and may be collared with adobe. Ventilator shafts, where noted,

are east oriented. Roof support posts are variable (some sites have none, two or four seem more common) (Frisbie 1967: 148-49, Oaks 1978). In general, pithouse architecture in the Albuquerque District does seem more closely allied to the northern Anasazi area than to the Mogollon region, although "elaborations" noted for the San Juan, such as benches, partitions, and slab lining are absent.

The Albuquerque District pithouses contain both Anasazi Gray wares and various brown wares, either directly imported from the Mogollon area or local imitations of Mogollon ceramics, viz. Corrales Red (Frisbie 1967). A recent literature search by Oaks (1978) indicates that brown wares have been found to extend not only into the Santa Fe area but as far north as Taos and are among the earliest ceramics recovered in the Navajo Reservoir District (Eddy 1968). Although McNutt considers pithouses to have been "introduced" into the Rio Grande area by groups arriving from the Chaco-San Juan area (McNutt 1969: 101), Peckham (1957), Schorsch (1962), Wetherington (1968: 88), Allen and McNutt (1955) and Vivian and Clendenen (1965: 19) suggest that the Albuquerque District may represent a frontier area between the Anasazi and Mogollon. This issue is addressed at greater length in the section dealing with an assessment of Anasazi cultural systems.

Pithouses reported for the Albuquerque District have been located on gravel bluffs near Sandia (Peckham 1957), on low terraces and sandy hills west of the Rio Grande between Bernalillo and Jemez (Reinhart 1968, Skinner 1965, Vivian and Clendenen 1965, Vytlačil and Brody 1958, Frisbie 1967) and on a hill top in Tijeras Canyon (Oaks 1978). In all cases, the sites are in close proximity to water in the form of intermittent tributaries of the Rio Grande. The visibility and recognition of these sites are extreme problems. In the area north and west of Albuquerque, the pithouses were located because they had been exposed by recent erosion or road cutting or because ground stripping was undertaken (Reinhart 1968, Frisbie 1967). In Tijeras Canyon, only extensive stripping and testing exposed the Basketmaker III-Pueblo I habitation area (Oaks 1978). Sites are not indicated by surficial depressions. Firecracked rock and burn areas are common and in the absence of

ceramics, they may be misidentified as Archaic. On the basis of these admittedly limited observations, I would suggest that pithouses are far more numerous in the Albuquerque District than excavations indicate. Finally, although Bullard (1962: 102), argues that pithouse sites which date prior to A.D. 900 are strategically placed with respect to both water and arable land, water seems to be the consistent association. A further critical topographic feature appears to be elevated terrain in uplands which could provide access to hunting and gathering loci and an over-view where game might be observed.

In the Northern Rio Grande, the beginning of Pueblo II (dated at about A.D. 900) is generally marked by the appearance of Red Mesa Black-on-white (Lang 1977b). Red Mesa also occurs at sites in the Albuquerque District and is associated frequently with San Marcial Black-on-white. A Local variety of Kwahe'e that dates from about A.D. 950 to about A.D. 1250 may be present as well (Wiseman 1976, Oaks 1978). Although the date of A.D. 900 is certainly not "sacred" in the Albuquerque District, it is convenient, in terms of correlations with the rest of the study area, to use it as a marker for Pueblo II. The termination of Pueblo II will, again for convenience, be considered to coincide with the shift from mineral to organic paint, manifest by the introduction of Santa Fe Black-on-white, dated to about A.D. 1200 (Breternitz 1966).

Some of the sites mentioned in the previous section have components which may be dated to Pueblo II by the presence of Red Mesa B/w, usually in association with Kana'a Gray or Kana'a Neck Banded. Pithouses 1 and 2 at the Dension site (Vivian and Clendenen 1965), pithouses 4, 7, 8, and 10 at the Sedillo Site (Skinner 1965), the second pithouse near Zia described by Vytlačil and Brody (1967) and pithouse 1 at Site III at the Artificial Leg sites (Frisbie 1967: 175) fit the Pueblo II category. In addition, Tonque Arroyo pithouse (Peckham 1954), the earlier component of LA 586 (Vulture Gulch) (Wendorf n.d.), LA 10793 and LA 12843 in Tijeras Canyon may be included also (Snow 1972, Farwell 1977, Oaks 1978). Sites IV and XX west of Corrales, although unexcavated are indicated in Frisbie's (1967) map as containing Pueblo II components. Finally, 22 sites located by the University of

New Mexico's survey of the lower Tijeras Canyon/South Sandia area but unexcavated would be included in this time period (Blevins and Joiner 1977, Cordell 1977b).

No abrupt architectural changes accompany the introduction of Red Mesa B/w. Pithouses which have been excavated may show more standardized floor features; four post roof supports, ladder holes, ash pits and sipapus are more frequent. LA 586 reportedly has post reinforced walls (Wetherington 1964: 175). Artifact inventories for excavated sites show considerable continuity, although full-grooved axes and two-hand manos are "innovations" (Vytlacil and Brody 1958). Quantitative floral and faunal data are lacking; however, identified animal bones include those of jack rabbits, cottontails and deer (Vytlacil and Brody 1958). The locations of sites which have Late Basketmaker-PI and P II components were described above. The 22 Tijeras Canyon sites mentioned are concentrated at relatively low elevations (below 6400 feet) and are either on or adjacent to alluvial land (Cordell 1977b). Blevins and Joiner (1977) believe that most of these Tijeras Canyon sites do not represent year-round occupations, and suggest that the canyon was used seasonally.

A "convenience date" of A.D. 1200 has been used to demarcate Pueblo II from Pueblo III in this section. This corresponds to the shift to organic paint, represented by the appearance of Santa Fe B/w, and to the beginning of the Coalition Period as defined by Wendorf and Reed (1955). Lang (1977b) defined Pueblo III in the northern Rio Grande as beginning at about A.D. 1050, with the appearance of Kwahe'e B/w. Either date may be justified, and this is discussed in the section assessing cultural systems. Wendorf and Reed (1955) use A.D. 1325 as the end date of their Coalition Period, and Lang (1977b) used a date of A.D. 1300. The difference in 25 years would seem to be completely arbitrary, but for reasons having to do with changes in settlement pattern I favor Lang's date. Although Pueblo III is defined here on the basis of the appearance of Santa Fe B/w, the great diversity in painted ceramic types that marks the period is of greater importance. In the Albuquerque District, Coalition Period sites contain some "pure" Santa Fe B/w, a locally manufactured Santa Fe/Wiyo B/w (Oaks 1978), local Kwahe'e B/w, Chupadero

B/w, Socorro B/w, and, usually a small percentage of St. Johns Polychrome. Galisteo B/w is often present and is considered especially important by Wendorf and Reed (1955), who believe it's occurrence represents an intrusion of migrants from Mesa Verde toward the end of the period. Other "diagnostic" characteristics of the period are an increase in the number of habitation sites (suggesting an increase in population,) and diversity in architecture. Pithouses do continue, but above ground roomblocks occur and these vary in size. In the Albuquerque District, rectangular kivas may be incorporated into roomblocks.

In the Corrales area, Frisbie (1967) indicates five Pueblo III sites. Of these, only the pithouses at Bandelier's Puaray have been excavated and, unfortunately, not completely reported (Tichey 1978). In Tijeras Canyon, Mera (1940) recorded components at LA 580, LA 583, and LA 581 (Tijeras Pueblo). Additional Coalition Period sites, and sites with Coalition components, in Tijeras Canyon include LA 846, LA 586 (Vulture Gulch), LA 1279, LA 5227 (Tijeras Plaza), LA 6906, LA 6907, LA 10796L (Santo Nino Cemetery), LA 11612, LA 11613, LA 12845, and LA 13812. Recently excavated Coalition Period sites in Tijeras Canyon include LA 10794 (Coconito) and LA 14857 (Dinosaur Rock) (Snow 1972; Oaks 1978).

The Dinosaur Rock site (Oaks 1978) provides a fairly good indication of the nature of Coalition Period sites. The site consisted of six rectangular rooms which had well-laid (often double-laid) floors, but which lacked interior features such as hearths. Three jacal structures south of the roomblock contained the greatest amount of cultural debris: food remains, circular adobe rimmed hearths and ashpits. Oaks (1978) suggests that the rectangular rooms were used for storage and the jacals as activity and living rooms. Artifact densities indicate outside work areas.

In Corrales and Tijeras Canyon, Coalition Period sites are away from upland settings in settings immediately adjacent to major drainages and arable land (Frisbie 1967, Oaks 1978). Blevins and Joiner (1977) suggest that Tijeras Canyon was first utilized on a year round basis during Coalition times. Frisbie (1967) believes the shift in location of sites reflects population

expansion in the central Rio Grande Valley and decreased agricultural land due to a postulated change in the seasonality of rainfall and subsequent arroyo cutting. The increase in population is not viewed as the result of immigration from Chaco Canyon by Frisbie or Wendorf and Reed (1955), but as internal population growth within the Rio Grande Valley.

Pueblo IV (Rio Grande Classic in Wendorf and Reed's 1955 terminology) is dated from A.D. 1300 to A.D. 1600. Wendorf and Reed (1955) use a beginning date of A.D. 1325 to coincide with the introduction of glaze decorated, red slipped ceramics. Recent excavation of Tijeras Pueblo (Cordell 1977b) place the initial occurrence of glazewares somewhat earlier at that site. The terminal date is arbitrary. Lang (1977b) uses A.D. 1540, because this date marks the first contact with Europeans. I prefer A.D. 1600 since it was not until then that Europeans had much direct effect on the Rio Grande populations. Glazewares were presumably made in imitation of the Zuni and Little Colorado ceramics. Shepard (1942: 197-199) believed the introduction of glazes represented a migration into the Rio Grande from the west, whereas Mera (1935) and Wendorf and Reed (1955: 150, 161) suggest diffusion, perhaps accompanied by movement of a small number of people. Although small amounts of western glazewares (such as Heshotauthla Red-on-orange) occur at Classic Period sites, the predominant amount of early Glaze was produced locally (Cordell 1977b, Warren 1977c, Oaks 1978).

Wendorf and Reed (1955) characterize the Rio Grande Classic as a period of "cultural florescence" when the population of the northern Rio Grande reached its maximum prehistoric extent, large aggregated communities were built and there was "elaboration" of material culture, manifested by mural paintings, decorated pipes, elaborate axes, carved bone tools, stone effigies and variety in vessel forms. In the Albuquerque District, aggregated communities existed at Kuaua (Tichy 1938), Alameda Pueblo, Bandelier's Puaray (Tichy 1938, Schaafsma 1968), Tijeras Pueblo (Judge 1974, Cordell 1975, 1977a, 1977b) and San Antonio (Snow 1976, Oaks 1978, R. Morrison, personal communication 1976), and possibly the Tunnard site (Hammack 1966). Aggregated communities in the Albuquerque District are not consistently

associated with low elevation settings, as Lang (1977b) has suggested. Classic Period sites between Corrales and Puaray recorded by Frisbie (1967) show a shift to river valley locations. Tijeras Canyon settlements are associated with seeps and springs that occur at various elevations. Lang (1977b) thinks that ditch irrigation along the major river courses may have begun early in the Classic. More important, a diversity of farming techniques seem to have been practiced (see Lang 1977b, Cordell 1977a). In addition to clustering of population, there was also frequent abandonment of these communities. Tijeras Pueblo was abandoned early in the Classic (ca. 1425), as were sites on the Pajarito Plateau and in the Santa Fe District (Wendorf and Reed 1955, Schwartz and Lang 1972). Wendorf and Reed (1955: 153) cite warfare and a drought between A.D. 1560 and 1585 as possible motives for abandonments, but the drought does not explain many sites which were abandoned earlier in the period. In Tijeras Canyon the number of sites attributed to the Classic Period is about the same as in the previous Coalition period; however, except for the few aggregated communities, the greater part of the remains consist of small, limited activity areas, such as chipping stations, and hunting or gathering loci (Cordell 1977a).

Studies of rock art (Schaafsma and Schaafsma 1975) and wall murals indicate an emphasis on the depiction of masks. Schaafsma and Schaafsma (1975) infer that this "Rio Grande" style derived from the Jornada Mogollon area and was related to the introduction of the Katchina cult.

Sites in the Albuquerque District with historic components include Kuaua, Paa-ko (Lambert 1951) and San Antonio (Snow 1975, Cordell 1977b). Francisco Vasquez de Coronado's 1540 expedition reached the Albuquerque area, and Coronado's men may have spent the winters of 1540-41 and 1541-42 at Kuaua (Parsons 1975). Missions were established in the 17th Century at Kuaua, and San Felipe de Neri (in Albuquerque, where it still stands). The mission of San Pedro del Cuchillo is recorded as having been established at Paa-ko in 1661, but although historic portions of the site were excavated, no actual mission structure was discovered (Lambert 1954). Prior to the Pueblo Revolt of 1680 a number of Hispanic colonists settled in ranches along the Rio Grande between

Kuaua and Isleta. The area was referred to as the Rio Abajo, but it was not an administrative unit. In 1706, following the re-conquest, Don Francisco Cuervo y Valdez, 28th colonial governor, founded a "Villa" (administrative unit) at Albuquerque, where the river could be forded by oxcarts and pasturage and timber were adequate. The original settlement, in what is now Old Town, consisted of twelve families who had moved from Bernalillo. In order to protect Albuquerque from raiders, Genizaro communities were established at Carnue, Tome and Belen, (Parsons 1975, Lambert 1954, Dozier 1970, Archibald 1976).

GALLINA DISTRICT

Archeological sites in the Gallina District comprise a diversity of architectural forms which date within a relatively narrowly defined temporal span. The terms Largo Phase (Mera 1935), Gallina Phase (Hibben 1938: 131) and Largo-Gallina Phase (Hall 1944: 4) have been used to refer to these remains. The diversity in terminology does not refer to temporally separable assemblages. The earliest dates reported for sites in the district are A.D. 1059 and A.D. 1106, after which there are no dates until the early A.D. 1200's. Numerous tree-ring dates cluster from A.D. 1200 to A.D. 1300 (Robinson et al. 1974, Seaman 1976: 16). It is generally agreed that the Rosa Phase of the Gobernador (Hall 1942) and the Navajo Reservoir District (Eddy 1968) is ancestral to the archeological manifestations of the Gallina District (Ellis 1976, Dick 1976, Ford, Schroeder and Peckham 1972). The Rosa Phase has been dated to ca. A.D. 700 to ca. 850 or 950 (Eddy 1968, Hall 1942: 61). Recognizing the chronological gap which separates the Rosa Phase from the beginning of the dated Gallina occupation, Dick (1976: proposes that the term Largo Phase be used for remains which date to between A.D. 950 - 1100, and Gallina Phase for sites which date between A.D. 1100 and 1275. Whether or not Dick's suggested terminology will be adopted depends on the researchers working in the area. In this report the term Gallina Phase is applied, because a temporal hiatus remains between the Rosa Phase of the Gobernador and sites of the Gallina District, and therefore Dick's proposed Largo Phase is largely an empty category.

The Gallina District has been characterized as one of relative isolation and the Gallina Phase as "conservative." These interpretations are based on the lack of evidence of much trade and/or interaction with the San Juan Basin centers of Mesa Verde and Chaco Canyon and considerable uniformity in the ceramics and other items of material culture. Hibben (1949) described five types of Gallina Phase ceramics, two of Gray ware and three of utility ware. Seaman (1976: 42-43) has proposed the Gray wares be grouped into a single type, with the utility wares as a separate unitary category. The Gray wares defined by Hibben (1949), Gallina Black-on-grey and Gallina Plain are unslipped, with dense homogeneous gray paste. The difference between the types is that Gallina B/g has carbon painted designs on bowl interiors and jar exteriors. Seaman (1976: 43) contended because "many Gallina Black-on-gray vessels present a large surface area with no design" the type distinctions were not warranted. Hibben's (1949) utility types are Gallina Plain Utility, Gallina Coarse Utility and Gallina Plain Unfired, distinguished on the basis of temper size and paste coarseness. A variety of surface treatment occurs, including scraping or wiping, banding, smearing, punching and incising. Seaman's (1976: 43) justification for grouping the utility wares into a single category is that the paste and temper criteria exhibit continuous distribution among the types. The lack of temporal or spatial variability in Gallina ceramics, noted by all workers, is supported by an x-ray florescence analysis performed on a sample of sherds from five Gallina Phase sites which indicated little variability in clays, suggesting either a single clay source or a number of geologically homogeneous clay sources from throughout the area (Seaman 1976: 42 and Appendix A).

The literature on Gallina site types reflects an overriding concern with architectural features which, like the ceramics, are not temporally significant in large part. The traditional distinctions include pithouses, small surface structures, "unit houses," cliff houses, pueblo-like structures, and towers (Hibben 1948, Pattison 1968, Mera 1938, Green 1964, Dick 1976). Dick (1976) provides a composite description of pithouses for the Llaves area which is generally applicable to the Gallina District as a whole. Pithouses predominantly are round;

interior features consist of a hearth, ventilator and deflector (aligned north-south), four post roof supports, storage bins on the east and west side of the ventilator opening, and an encircling bench along the wall between the bins. Pithouse communities contain from two to eight pithouses in geographical proximity and are associated with surface structures. The latter consist of from one to four rooms and seem to have been used for diverse, purposes including corn drying, storage, meal and turkey pens (Dick 1976: 26-27).

Gallina Phase "unit houses" are surface structures built of massive, often heterogeneous, rock masonry with varying amounts of mud mortar. A north-south orientation of interior features; U-shaped deflector, slab-lined hearth, and ventilator is standard within the rectangular room. A banquette, sometimes containing storage bins, lines the north, east and west walls. The southern part of the room is set off by storage bins extending out from the walls. Ventilator holes occur near the floor of bins. House floors are generally slab-lined, and a four post roof support arrangement is most frequent (Dick 1976: 21-25). Subfloor cists with narrow openings and expanded bases provide additional storage space. Dick (1976:25) reports one instance of additional storage bins on a house roof. Unit houses generally occur as isolated structures, but double and triple house units have been noted (Dick 1976:21). There is considerable similarity in pit and unit house features and layout. Tree-ring dates from the two types of structures overlap (Robinson et al. 1974).

The "cliff houses" and towers, most commonly linked with the Gallina area in popular literature, actually are the rarest types of sites (Dick 1976: 21). Most of the cliff houses are identical to regular surface unit houses but are located in rock overhangs (Pattison 1968, Dick 1976). The towers, first remarked by Douglass (1917), were identified by thick walls and abundant wall-fall, indicating considerable height. Dick (1976: 17) considers Bg 20 and Bg 19 at the Hormigas site, both on Rattlesnake Ridge (reported by Hibben 1948, Green 1956) and Bg 21 at the Carricito Community (Green 1964) as certain towers. In addition, he noted three similar structures in his surveys, one at

the Chupadero Camp settlement and two on Mesa Golondrina (Dick 1976: 16-18). The towers are circular structures near the centers of communities. They are not located in topographic positions which provide a view of the surrounding terrain (Dick 1976: 17-18). Those excavated towers lack interior domicile features, evidence two successive components and seem to have served as storage units before abandonment (cf. Dick 1976: 17-18, Whiteaker 1976). Although other specific structures have been identified as towers in the literature (cf. Douglass 1917, Green 1964, Ellis 1976), without excavation the certainty of the designation is doubtful (Ellis 1976:30).

Pueblo-like structures were reported by Hibben (1948: 33) for the Gallina District, although at that time none had been excavated. L/120 (Mohr and Sample 1972), eight miles east of Lindreth on a low bench, on the north side of the Canada Larga, consisted of two structures which would seem to fall within this category. Structure C comprised a 12 room rectangular building divided into four sections by three east-west walls, further divided by short north-south walls. Two periods of occupation were noted. During the first, one room had a lateral entrance from the exterior, and interior doorways connected four rooms. Only two rooms had firepits; one of these had a U-shaped deflector. The structure had burned. After reoccupation, all but one room had been replastered. Structure B, at the same site, was partially excavated and had been severely vandalized. Mohr and Sample (1972) suggest that it was composed of six rooms, possibly with a second story. Unfortunately, tree-ring dates for either of these structures could not be obtained. Mohr and Sample (1972) compared L/102 with Green's (1968: 56) description of Bg 80 in the Leeson area, which was a rectangular structure enclosing 12 rooms. Although construction methods appear to have been similar, Bg 80 did not contain interior floor features, and Green (1968: 56) considered it a granery. Bg 80 has been dated to post A.D. 1232 (1199vv - 1232vv) by one tree-ring date. Another tree-ring date of A.D. 1656, from the same site, may represent Navajo occupation or Navajo use of the site (Robinson et al. 1974, Snow 1976).

Finally, mention should be made of three

other types of archeological manifestations in the Gallina District: agricultural features; reservoirs, and seasonal camps. As early as 1917, Douglass recorded terraced gardens and a possible dam on Mesa Golondrina (Dick 1976: 10). There are frequent references in the literature to low rock terraces and rock bordered gardens, but their specific locations generally are not given (cf. Pattison 1968, Hibben 1940, 1948, Dick 1976: 20). Douglass (1917: 5) and Dick (1976: 1) indicate that Golondrina Tank was once the location of an ancient reservoir, and Dick (n.d.: 19) suggests that a dam tapped a portion of ancient Capulin Creek below Huerfano Mesa. Bahti (1949: 52) reported a reservoir on Rattlesnake Point at Bg 20/2 and recent contour mapping and test excavation of this feature (Perret 1976: 5 in Ellis 1976) have confirmed the identification. Perret (1976: 5) estimates that the Bg 20/2 reservoir had a capacity of about 6600 gallons. LA 10643 and LA 10644 reported by Ellis (1974) have been interpreted as seasonally utilized Gallina Phase sites; they are located on high elevations at Turkey Springs. LA 10643 includes several "nest-like" houses and crevice caves at an elevation of about 8600 feet. LA 10644, situated at about 10,000 feet, consists of 5 circular pithouses; three of these were excavated and found to lack both ceramics and fireplaces (Ellis 1974b: 4).

Particular items of material culture considered diagnostic of the Gallina Phase, in addition to the rather standard architectural features and the ceramic types mentioned are pointed bottom pots, small elbow pipes with supporting knobs, an emphasis on worked antler, comb arrow-polishers and tri-notched axes (Mera 1938:9, Hall 1944:60). As noted above, the tri-notched axe is reported from Valdez and Pot Creek Phase sites in the Taos District (Vickery 1969:193). In terms of culture history, Hall (1944) proposed that the Rosa Phase sites of the Gobernador area should be considered ancestral to the Gallina Phase, and this is generally accepted (Ellis 1976, Ford, Schroeder and Peckham 1972). Importantly, one of the Rosa Phase "traits" previously not known in the Gallina District, stockaded settlements, has been reported recently. LA 11843 consists of a pithouse, two surface structures and 11 exterior hearths and work areas surrounded by a stockade. The site has been tree-ring dated to the early A.D. 1100's

(Seaman 1976). Stockaded Rosa Phase settlements are also reported for the Navajo Reservoir District of the San Juan (Eddy 1968). A link between the Gallina Culture and protohistoric and historic sites of the Jemez Pueblo, first suggested by Reiter (1938) on the basis of floor features and room configuration at Unshagi, also is generally agreed upon (Ford, Schroeder and Peckham 1972).

Questions relating to the culture history of the Gallina District require a critical evaluation of the degree to which our information about this area is biased as a consequence of the kinds of sites that have been excavated and the diversity of sites recorded in surveys. A definitive critique entails additional systematic survey and excavation; at best current knowledge offers sketchy guidelines for further research. First, the later prehistory of the Gallina District exhibits several parallels with the Taos District, including the relatively late appearance of pithouses, continued use of pithouses and the location of pithouse communities (and, in the Gallina District, associated unit house communities) in areas of topographic relief. Importantly; however, Archaic manifestations occur in the Taos and Chama areas but have not been recorded in the Gallina District. There would, again, seem to be two possible reasons for this: surveys have concentrated on habitation sites; and dense vegetation cover makes visibility and recognition of Archaic remains difficult. If systematic surveys are conducted and either of these possibilities becomes untenable, alternative explanations should be pursued.

While the relationship between Rosa Phase and Gallina Phase manifestations is generally accepted, sites of a "transitional" nature have not been documented for the Gallina. In this case survey and excavation bias indeed may be responsible. There is general agreement that during the earlier portion of the Gallina Phase, pithouses were the predominant dwelling form and that both pithouses and unit houses occur in the later Gallina Phase (Dick 1976, Ellis 1976). Pithouses are characteristic of the Rosa Phase (Hall 1944). Dick (1976) and Smith and Dick (1976) note that in the Llaves area pithouse sites outnumber unit house sites by five or six to one, yet most excavations have dealt with unit houses. The single excavated site which most

closely conforms to the expected character of a transitional Rosa Phase/Gallina Phase site is the stockaded pithouse LA 11843 (Seaman 1976). Unlike other excavated pithouses LA 11843 consisted of an isolated structure, and Seaman (1976:116) states that isolated pithouses or loosely aggregated pithouse clusters form a distinctive, but ignored, Gallina settlement type. He remarks that "there are literally hundreds of single pithouse depressions throughout the Gallina area, especially in the foot hills north of the San Pedro Mountains" (Seaman 1976:116). In view of the acknowledged bias in the excavation of unit houses and fairly densely aggregated communities of pithouses and unit houses, it would seem reasonable that if transitional Rosa-Gallina Phase structures are to be excavated, more attention should be paid to the isolated pithouse type site. It should be kept in mind that excavation is not likely to provide evidence of stockades if only the house structure is excavated. The hearths, work areas, surface structures and stockade found at LA 11843 covered an area of about 550 m² (Seaman 1976:38).

Bias in excavation and in the selection of attributes which identify Gallina Phase artifacts appear to have contributed to the notion that the Gallina Phase represents a static cultural manifestation of "aberrant and war-like provincials" (Seaman 1976:122). As noted above, traditional ceramic typologies do indicate relatively little change through time. On the other hand, Seaman (1976:48) demonstrated an increasing proportion of Gray ware jars to bowls among seven Gallina Phase sites dating from A.D. 1100+ to A.D. 1240-1270, and interprets this evidence as indicating increasing dependence on storage through time. Comparable data for utility forms were not available, but after A.D. 1200 the relatively large pointed bottom forms predominate and are associated with increased site size. While not conclusive, Seaman's approach indicates that some of the static quality attributed to the Gallina results, in part, from a failure to monitor relevant, temporally sensitive variables. Seaman (1976:120-121) compared LA 11843 and LA 11850, which tree-ring dates indicate were occupied about 100 years apart. He found that LA 11843, the earlier site, contained a lithic assemblage suggesting high energy expenditure in curating and manufacturing tools that could be related to hunting activities, a faunal assemblage

with emphasis on larger game such as deer and elk, a lower ratio of jars to bowls and a lower average volume of utility jars. LA 11850 (Fiero 1976) had a larger ground stone tool assemblage, indicating greater reliance on plant processing, increased storage features and a predominance of jar and pointed bottom ceramics, also consistent with greater storage and processing of plant food. The results of a comparison between only two sites are certainly not conclusive, but further studies along these lines are worth pursuing.

The defensive nature of Gallina Phase site emplacement (on ridge tops with difficult access) and the large number of burned sites have been commented on frequently (Hibben 1938, 1944, Ellis 1976). Seaman (1976) suggests that this again may reflect excavational bias toward later Gallina Phase settlements.

The notion that the Gallina peoples were warlike derives, in part, from two observations. The first is that sites are located on the tops of steep ridges. The second is that a relatively large number of houses were burned. The first observation may be the result of excavational bias as discussed. The available literature does not provide enough information to determine precisely the frequency of burned houses or whether pithouses or unit houses are more likely to show evidence of conflagration. However, it is valuable for perspective to note that of the 13 pithouses excavated on Turkey Foot Ridge, in the Mogollon area west of Reserve, New Mexico, 11 were burned (Martin and Rinaldo 1950).

Recently reported paleoenvironmental data for the Gallina District (Mackey and Holbrook 1978, Holbrook 1975, Holbrook and Mackey 1976) need careful evaluation because the results of this research have been treated as the key to Gallina archeology (Ellis 1976, Seaman 1976). The most recent study (Mackey and Holbrook 1978) provides data from 23 sites in the Llaves area and analyses of microtine rodents, corn, pollen, and arroyo cutting that attempt to document increasingly xeric conditions in the Gallina District from about A.D. 1250 until after the area had been abandoned sometime after A.D. 1300. The investigators maintain that two species of mice (Microtus mexicanus and Peromyscus leucopus) that are presently restricted to areas of New Mexico which

are more mesic than the Llaves area occur in the earlier Llaves dated sites, that the mean number of rows per cob of carbonized maize, the mean basal, mid-cob and shank diameters and cupule widths of maize decrease through time, and that there was progressive river entrenchment. While I agree that the diverse evidence presented indicates changed climatic conditions in the Llaves area between the 13th century A.D. and today, there are several problems in interpretation. First, the published site chronology (Holbrook and Mackey 1978) shows so much overlap of dates that it is difficult to determine when more mesic conditions existed. Second, although most impressive, the data which concern the microtine fauna assume that mice were not intrusive on occupation floors. Third, only about half (50.4%) of the mean number of rows per carbonized corn cob is accounted for by the date of the site from which the corn was obtained. Fourth, of the 20 sites for which elevations and dates are given, site type (pithouse, unit house, tower, etc.) is indicated in only four cases. This makes determination of possible functional distinctions among sites impossible. Site function is critical to interpreting the pollen recovered. Fifth, sites LA 11843 and LA 1150 which do seem to be temporally separated by the greatest time gap (but only about 100 years) are not included in the analysis.

It is my feeling that the detailed paleoclimatic reconstructions attempted by Holbrook and Mackey should be pursued, however, such approaches must be combined with adequate monitoring of temporal and functional variability in sites and with deductive models that specify locational and functional expectations about sites which are not already known. For example, given the data available on the archeology of the Gallina District, it is not sufficient to relate an apparent (but as yet insufficiently documented) increase in storage and the abandonment of the region to a decrease in effective moisture in about A.D. 1250. There must be an understanding of the range of variability in adaptive strategies through time and the constraints on this variability that are imposed by density dependent (population) and density independent (environmental) change.

The relatively well-known chert quarries of the Cerro Pederal may have been used as early as the Clovis period. Warren (1974:90-91) discusses and illustrates two bifacial knives or point preforms which are probably Clovis. Discovered in a cache on a tributary east of the Rio Tesuque, they are made of the distinctive Pederal chert. The recent work by Schaafsma (1975, 1976), as part of the Abiquiu reservoir project documented Archaic utilization of the Chama District from ca. 1800 B.C. (Armijo Phase); he considers the Archaic occupation to be relatively intensive, perhaps representing one aspect of a seasonal round.

Until recently no indication of late Basketmaker-Early Pueblo utilization of the Chama District had been documented. Evidence for this period is still scant, but Schaafsma (1976:49, 50) located nine Basketmaker III - Pueblo I points within the Abiquiu Reservoir survey area. Two of the points were associated with the pedregal quarries in Canones Creek and indicate only that the chert deposits were used during Basketmaker III - Pueblo I times. Two sites, one on the second terrace above the Chama river near Arroyo del Chamiso and the other at the lower end of Chama Canyon, consisted of lithic scatters including Basketmaker III points, but Schaafsma (1976:65) does not think that the scatters indicate single component Basketmaker III sites. These localities are AR-129, on a terrace in the Windmill area of the survey, and AR-150 on a bench northwest of Ghost Ranch. An isolated Basketmaker III point was located on the second terrace above the river near Iron Springs. West of the Chama River on Ghost Ranch Property two partial Late Archaic or Early Basketmaker points were collected from an area where hundreds of non-utilized flakes and several cores were found (Royce 1976). While all of these sites lack ceramics, structures, hearths, or other artifacts which might indicate more than temporary use of the Chama district in Basketmaker - Pueblo I times, they are nonetheless significant, because they comprise the sole evidence of even minimal occupation of the area during this period. Schaafsma (1976:50) suggests that use was

restricted to temporary hunting activities; however, the possibility that the lithic scatters and associated points represent historic Ute re-utilization of scavenged points should be considered.

Undifferentiated lithic scatters are common in the district (Schaafsma 1976, Roye 1976, Klaenhammer 1975, Whiteaker 1976). Recently three of these locations were excavated (Klaenhammer 1975, Whiteaker 1976, Speth 1973), and provide information which makes apriori assignment of lithic scatters to Archaic and early Anasazi groups unsound. LA 11836 (Klaenhammer 1975) and LA 10998 (Speth 1973) contained no diagnostic artifact types; the former apparently is a quarry. LA 11828 (Whiteaker 1976), which yielded considerable quantities of fire-cracked rock and hearth areas was found, on excavation, to include corrugated utility ceramics, Abiquiu Black-on-gray (Biscuit A), and Tewa polychrome sherds as well as projectile points comparable to those reported for the large Pueblo III-IV sites in the area.

Anasazi occupation of the Chama District is well documented from about A.D. 1200 (Pueblo III) to the Spanish period, although the very large sites date to the 14th and 15th centuries. In his 1937 survey report, Hibben distinguished between "Wiyo or biscuitoid ruins" and "Biscuit ware ruins." The two classes of ruins also differ in size and settlement plan (Hibben 1937). Hibben's distinction between the two categories is related to the notion that the "Wiyo" sites were abandoned prior to the construction of the last phases of building at the "Biscuit" sites, although the "Biscuit sites" might contain components which pre-dated the appearance of Biscuit A ceramics at about A.D. 1375 (Hibben 1937 Bannister 1963:328). The distinction seems to be useful and is retained here. Hibben (1937) lists the Leaf Water ruin, another ruin "above the canyon of the Chama, about ten miles above Abiquiu, and on the left side of the river," and the Riana Ruin, which he excavated, in the Wiyo group. In addition, the Palisade Ruin (LA 3505), excavated by Peckham (1974), Homayo (Hungpobi) and the small "farming village," LA 11830 (Enloe et al. 1974) belong in this category on chronological grounds. Of these sites, Riana Ruin (Hibben 1937), Leaf Water (Leubben 1953), Palisade (Peckham 1974) and LA 3505 (Enloe et al.

1974) have been excavated. Except for LA 11830, the ruins exhibit similar plans. They are roughly quadrangular, with room blocks on three sides of a plaza; the fourth side is enclosed by a palisade of jacal or a line of stones. A circular kiva was located near the center of the plaza area at Riana and at Palisade while the two kivas identified at Leaf Water were placed next to the room tiers (Leubben 1953:21). Rooms are rectangular, with the long axes generally paralleling the plaza. Construction at the Palisade site and Leaf Water was primarily adobe, with some masonry rooms. The Riana structures were built almost entirely of basalt "boulder" masonry, a difference Peckham (1974) attributes to the availability of building material.

The single plaza kivas at Riana and Palisade were round, with a central fire pit and an east-oriented ventilator. No roof support posts were found in either structure. Of the two structures referred to as kivas at Leaf Water one was oval and the other rectangular; both had firepits located on the side of the room. Because two structures referred to as pithouses, also were discovered at Leaf Water and, since the plaza surface was not cleared but explored by means of two rather short trenches, the "kiva"/pithouse distinction appears arbitrary; a plaza kiva was either not present or not found. Ceramic inventories for all these sites consist of small amounts of Santa Fe B/w, Wiyo B/w of both the Valley and Pajarito varieties (Hibben 1937) and an unnamed corrugated ware, common in the area. Small amounts of St. Johns Polychrome occur as a trade ware. Both the ceramic inventories and the tree-ring dates indicate that the sites were built and abandoned between A.D. 1200 and A.D. 1375. Of the three pueblos, Riana Ruin, with 26 rooms, is the smallest, the Palisade site with about 50 rooms second in size and Leaf Water the largest, with an estimated 100 + rooms. Artifact inventories were similar, but Leaf Water Pueblo had a greater variety of trade ceramics and artifacts, and more numerous grooved axes, pipes, bone awls, bone whistles and bone beads. Peckham (1974) attributes the variability to the greater size of the pueblo. LA 11830 comprises a grid of aligned river cobbles; it is suggested that the arrangement represented a combination of garden plot and field house perhaps seasonally occupied. Stone grids are numerous in the Chama

area and the association of grids and field houses may be unique to the region. Although not precisely dated, LA 11830 is estimated to have been used between A.D. 1200 and A.D. 1450. Botanical identifications and chemical analysis of soils from the site have been undertaken but are not yet reported (David Snow, personal communication 1978).

The large Biscuit ware sites were first described by Bandelier (1892); the majority were sketched and mapped by Hewett (1906) and Mera, (1934) and further described by Hibben (1937). Excavations were conducted by Jeancon (1919) at Po-shu-ouinge, and for portions of Te'ewi (Te'ewo'onwikeji) by Wendorf (1953). Much of Sapawe was excavated by Ellis but remains unreported. Tree-ring samples were taken from Tsiping (Chipiinuine) Howiri (Houiri), and Homayo (Hungpobi) (Hewett 1938). Other large Biscuit ware sites listed by Hibben (1937) are Tsama, Po-nyi Pakuen, Psere, and Ku. Biscuit settlements apparently underlie both the modern communities of Abiquiu and Barranca, and in the Ojo Caliente Creek drainage include Posi, Nute and Ponsipa'akwaye in addition to Howiri and Hubpobi, mentioned above (Hibben 1937). Although these sites have been explored by archeologists and collectors, there is little published information to synthesize. Most of the attention in the few archeological reports available is devoted to ceramics. Hewett's (1906) sketch maps are recognizably accurate as is his locational data and that of Hibben (1937). Most characteristic of these ruins is their size. Wendorf (1953:37) estimates 600 rooms for Te'ewi, while Sapawe is considered the largest adobe ruin in New Mexico, with multiple plazas and at least 19 kivas (Hibben 1937). At Te'ewi (Wendorf 1953) rooms were constructed of adobe and masonry; some of the excavated adobe rooms had walls reinforced with interior poles, a characteristic discussed at some length by Wetherington (1968), because of its importance in the Taos-Picuris area.

Both Sapawe and Te'ewi had a single very large kiva in addition to multiple small kivas. The diameter of the large kiva at Te'ewi is given as 10.4 meters (Wendorf 1953:48). Constructed of coursed adobe it was circular with an east ventilator and central firepit and deflector. Like the kiva at Old Picuris there were subsidiary

west ventilators or entrances. Wendorf (1953:49) describes and illustrates a "north oriented subfloor pit" and numerous "loom holes" which resemble the floor features described for Old Picuris (Holschlag 1975:58). The Te'ewi large kiva (as well as the kivas at Old Picuris, Pot Creek Pueblo and modern Taos) lack a sipapu. The "little kivas" described for Te'ewi (Wendorf 1953:50) are circular, slightly over 6 meters in diameter, with an east ventilator tunnel, central firepit, ashpit, "landing slab" (deflector slab?) interior roof support posts and multiple sipapus. The sub-floor pits illustrated (Wendorf 1953:48) resemble the foot drum grooves present at Pot Creek and Picuris (Holschlag 1975:58). Wendorf (1953:50-51) compares the Te'ewi little kivas with kivas at Tijeras Canyon (Vulture Gulch?), Arroyo Hondo, Pueblo Pindi, and at Arroyo Negro in the Santa Fe District.

The ceramics from Te'ewi included small amounts of Santa Fe and Wiyo B/w, Biscuit A (Abiquiu B/g) and Biscuit B (Bandelier B/g), Potsuwi'i Incised, corrugated culinary, "mica culinary" and an apparently transitional variety of Biscuit B and Sankawi B/c. Trade wares comprise small amounts of Galisteo B/w, St. Johns polychrome and Rio Grande Glazes (Wendorf 1953:55-57). Ceramics from Sapawe include small amounts of Wiyo, both Biscuit wares and "Tesuque Smeared Indented Corrugated" among other types. It should be noted that according to Vickery (1969:254) "no single characteristic as listed by Hawley (1950) is sufficient to separate Tesuque Smeared Indented Corrugated from the Taos Gray Smeared Indented Corrugated, other than range." In addition, the similarity between the "unusual" Biscuit "doughnut" form vessel found in Kiva II at Te'ewi to vessels of this shape from Classic Mimbres should be remarked. A vessel of the same form was reported from Poshouingue by Jeancon (Wendorf 1953:55).

In Wendorf's (1953:94) view, the large Chama Biscuit sites resulted from the aggregation of population rather than migration into the area. He notes that "there were numerous small sites which were contemporary with Leaf Water and the early phase at Te'ewi in the high upland country bordering the Chama Valley. The majority of these sites were abandoned at the same time the larger pueblos appeared

in the Pajarito Plateau and Chama areas" (Wendorf 1953:94). Peckham (1974) suggests that the inhabitants of the Palisade Ruin moved to Tsiping. Tsiping, in fact, contains Wiyo and Biscuit components, and has been tree-ring dated to from A.D. 1250 to A.D. 1400, indicating continuity in occupation between the Wiyo and Biscuit periods (Hewitt 1938:26).

Although Wendorf (1953:94), following Mera (1934:19), considers that the Chama Valley declined in importance as a population center shortly after A.D. 1500, three sites, which Hibben (1937) refers to as Tewa polychrome and historic ruins, indicate that the Chama district was not completely abandoned by the Anasazi. These are; the Anasazi site underlying the historic chapel of Santa Rosa de Lima de Abiquiu, some three miles south of modern Abiquiu; Greenley ruin, five miles above the mouth of El Rito Wash; and San Gabriel de Yunque, at the confluence of the Chama and the Rio Grande. Both Hibben and Herbert Dick did some test excavation at the Santa Rosa de Lima de Abiquiu site, but reports of their work have not been published. Ellis excavated the original Spanish settlement at San Gabriel de Yunque.

In addition to the large Pueblo sites, the Anasazi occupation of the Chama is associated with numerous garden areas, garden and field house associations, shrines and rock art sites. The "farming village" of LA 11830 was discussed above. In addition, Skinner (1965) reports 24 "field houses" and 2 boulder rectangles, which may demarcate garden plots, within one square mile of Sapawe. Hibben (1937:16-17) detected "at least 2,000" boulder rectangles in his aerial photographs on the lava-topped mesa east of Abiquiu and notes that these features had been referred to as shrines by Jeancon (1923). As an alternative, Hibben stated that "a more obvious explanation would be that they are the remains of ancient maize terraces" (1937:17). The results of the analysis of LA 11830 should be enlightening with respect to this interpretation. It would also be worthwhile to compare the physical characteristics and the topographic settings of the boulder alignments with the agricultural features known from the Picuris area (discussed above). In addition, some of the boulder rectangles enclose areas which are filled with what

are described as "hand picked gravel of about egg size" (Hibben 1937:17) which Ellis (1975) has referred to as "gravel mulch gardens." Small circular or rectangular outlines of cobbles that lack artificial debris are generally considered shrines because of their similarity to ethnographically known examples (Snow 1975).

Rock art sites in the Chama drainage consist of petroglyphs which Polly Schaafsma (1972) considers representative of the general "late Rio Grande style." Although this style varies from one district to another, fairly large representations of masks, anthropomorphs and shields are common elements.

"Lodge sites" and tepee ring sites, which may be the remnants of former lodges, are numerous in the Chama area and generally ascribed to the Ute or Navajo (Hibben 1937, Swadesh 1974). Hibben (1937:13) describes the lodges as built of posts and split beams set vertically on end and coming together at an apex in the center, with the bases of the posts being supported by boulders and sandstone slabs.

SANTA FE DISTRICT

The Santa Fe District is here broadly defined to include the Galisteo Basin and Pecos areas on the east, the area just south of the confluence of the Chama and Rio Grande Rivers on the north, and the White Rock Canyon-Cochiti areas on the west, exclusive of the Pajarito Plateau. The southern boundary is somewhat arbitrary, running from the Jemez River south of Cochiti and east to the Galisteo. I follow McNutt (1969) in excluding the Pajarito Plateau, but in doing so considerable artificiality is introduced.

Lang (1977a:20) has documented both Basketmaker II and Basketmaker III components in the San Cristobal drainage of the Galisteo Basin. He views the lithic assemblages evidence of continuity with the Cochise tradition but finds a shift in site location in late Basketmaker II which continues into Basketmaker III and Pueblo I. Early Basketmaker II sites are on mesa overviews in proximity to reliable sources of water. Lang (1977a:18) suggests that they indicate hunting activities, probably during fall and/or winter. In

Late Basketmaker II and Basketmaker III, there is a shift in site location, and type of site, possibly indicating use of the basin for warm season foraging and gathering activities, perhaps including agriculture. The evidence comprises large base camps with numerous hearths and earth ovens. Basketmaker III and Pueblo I sites are farther from permanent water than Basketmaker II sites, but are "adjacent to a major inner canyon area of high agricultural potential" (Lang 1977a:373). Lithic raw materials recovered from the Basketmaker III-Pueblo I sites reflect extensive use of similar intrabasin chert resources and, at one site, a wide range of raw material sources. Lang (1977a:375) believes that this difference in the use of stone may reflect chronological, geographic and/or social differences among sites. Despite his observation that the lithics represent some continuity with the Cochise tradition, Lino Gray, an Anasazi type, comprises the only ceramics associated with the Basketmaker III-Pueblo I components.

Biella and Chapman (1977:120) list seven sites with Basketmaker III components known from previous work in the Cochiti-White Rock Canyon area, a number not augmented by subsequent survey of the permanent pool of Cochiti Reservoir (Chapman and Biella 1977:9). Five of these are in the Rio Grande drainage below White Rock Canyon; two in the Santa Fe drainage. According to Biella and Chapman (1977:117), the sites are usually small, consisting of one to three pithouses with associated surficial storage areas. The transition between Basketmaker III and Pueblo I is not marked, and most documented sites comprise components that apparently span both periods. Ceramic types associated with the Pueblo I sites in the Cochiti area are those present in the Albuquerque district (Jan V. Biella, personal communication, 1978). There is not a great deal of evidence, but Late Basketmaker-Pueblo I in the Albuquerque district, the Cochiti area and the Galisteo Basin seems to manifest general expansion in warm season use, probably related to agriculture and gathering, a pattern that may be general in the Anasazi Southwest (Glassow 1972). It would appear that this shift settlement from upland hunting to warm season camps could be documented for the Cochiti area between the earlier and later Basketmaker-Pueblo I periods by examination of localities such as LA 9906.

This is an open Basketmaker II site reported from the Rio Chiquito portion of the James Webb Young Ranch (Frisbie, Moore and Spielbauer 1970), but the distance of this site to water and the lithic materials are not described.

Red Mesa B/w is generally considered characteristic of Pueblo II, and it does not seem to date before A.D. 900 (cf. Lang 1977a:380, McNutt 1969, Allen 1973). The amount of Pueblo II material recorded in the Santa Fe District is meagre. Lang (1977a:380-382) indicates a scarcity of Pueblo II sites in the Galisteo Basin, and suggests that excursions into the basin were transitory and apparently related to trade and summer hunting. He documented only two locations in the San Cristobal drainage (SC 188 and SC 143) which seem to have been utilized during Pueblo II. SC 188 is a lithic scatter on a narrow mesa with an overview of the confluence of Piedra Lumbre Canyon and San Cristobal arroyo. Evidence for its use during Pueblo II consisted of a single point resembling a style found at the Tesuque By-Pass site (McNutt 1969), discussed below. SC 143 is a rock shelter which seems to have been utilized from Archaic through Pueblo IV times. The Pueblo II manifestation comprised a Red Mesa jar (Lang 1977a:149). No sites dated to Pueblo II were located in the survey of the James Webb Young Ranch (Frisbie, Moor and Spielbauer 1970). Although 36 Pueblo II sites, or sites with Pueblo II components, have been documented in the White Rock Canyon-Cochiti area (Biella and Chapman 1977:120-121) most lack any descriptive information beyond their location. The available data indicate that the sites are small and that overall site density in the area is low for this time period (Biella and Chapman 1977:117). Pueblo II sites were not found during the intensive survey of the permanent pool of Cochiti Reservoir (Chapman and Biella 1977:9).

One excavated site, the Dead Horse Site (LA 272, Honea 1971), in the Santa Fe River drainage, near White Rock Canyon, contained about equal amounts of Piedra Black-on-white and Red Mesa Black-on-white, the only decorated ceramics recovered. The more abundant utility wares consisted predominantly of brown-wares (La Bajada Brown, unidentified brown and Alma Plain) along with some

Lino Gray and Pena Blanca Gray. In view of the presence of Red Mesa, I would consider the site Pueblo II, although Honea (1971:18) suggests tentative bracketing dates of A.D. 850 to 950 based on the ceramic assemblage. Unfortunately, tree-ring dates could not be obtained and Honea (1971:18) states that "L.A. 272 has not been placed within an established phase designation." The site consisted of three simple unplastered pithouses and surface structures. The pithouses had four-post roof supports, south-east oriented ventilators and were rather irregular in shape. The first "surface house" consisted of nine rooms, three of which had shallow fire pits. Wall bases were basalt slabs and cobbles, and it is suggested that walls were of adobe. The second "surface house" was only tested, but it appeared to consist of two rooms. Fragments of three trough metates, projectile points, scrapers and knives were recovered (Honea 1971), as were corncobs and hackberry pits (Ford 1971).

Low site density for the early Anasazi period (prior to A.D. 900) is also documented for the survey from the upper canyon of the Arroyo Hondo to the Rio Grande reported by Dickson (1975, also see Schwartz and Lang 1972). The few sites reported were located on the floodplains of the Rio Grande and Santa Fe Rivers.

North of Santa Fe, Pueblo II is represented at the Tesuque By-Pass Site (McNutt 1969), the Tsogwe Site (LA 746) (Allen 1973), and LA 835 (Stubbs and Stallings 1953:155, Stubbs 1954, McNutt 1969). McNutt (1969) compares the ceramic assemblage at the Tesuque By-Pass Site with excavated sites in the Albuquerque District, particularly the Zia, Santa Ana and Sandia Sites (Vytlacil and Brody 1958, Allen and McNutt 1955, Peckham 1957), discussed above. However, he notes that in the Albuquerque District, Red Mesa is accompanied by pottery of the Lino series and San Marcial, Alma Plain and Mogollon R/b, whereas the ceramics from the Tesuque By-Pass site consist of Red Mesa B/w, Taos B/w, neck-banded utility vessels, and unidentified B/w, which appears transitional between Red Mesa B/w and Kwahe'e B/w. McNutt (1969:83) states that this ceramic inventory "is to be found primarily on the east side of the river Rio Grande, between Santa Fe in the south and the Rio Chiquito in the north." Further

he considers the ceramic complex represents migration into the Rio Grande from the west by way of the Rio Puerco and Jemez River Valleys (McNutt 1969). This view is shared by Allen (1973) in his interpretation of the Tsogwe Site that yielded abundant Red Mesa, but also Taos B/w, Kwahe'e B/w and utility ware which is described as "brownish and friable," (Allen 1973:5). The Red Mesa component of the Tesuque By-Pass and Tsogwe sites consisted of pithouses, apparently with associated surface structures. LA 835 (Stubbs and Stallings 1953:155) seems to date between A.D. 950 and A.D. 1100. It consisted of about 12 small house units; each comprising from ten to 20 rooms, a great kiva and "circular and rectangular kivas (both surface and subterranean)" (Stubbs and Stallings 1953:155).

From the perspective of culture history, the problems in dealing with Pueblo II in the central Rio Grande area involve three major issues. First, archeologists working with models of in situ cultural growth of Rio Grande populations are troubled by the "hiatus" in occupation apparent in the Cochiti area and the Galisteo Basin. (cf. Flynn and Judge 1973, Biella and Chapman 1977, Chapman and Biella 1977). Second, scholars who prefer migration models in order to explain data have difficulty accepting the presence of Red Mesa B/w from the west with pithouse complexes that lack typical San Juan features, such as "winged firepits" (McNutt 1969), or later San Juan kiva features such as pilasters and benches. Third, the dating of the various Rio Grande B/w wares, and the belief that they were either introduced from the San Juan or developed in the Rio Grande as copies of San Juan types, provides endless sources of dispute when it is assumed that the appearance of types such as Red Mesa, Kwahe'e, Taos B/w, and Santa Fe B/w must be sequential. At the risk of more controversy, I suggest an alternative approach in the Assessment Section below.

Again I use a convenience date of A.D. 1200 for the beginning of Pueblo III. I do so here, because it does mark the introduction of Santa Fe B/w, which most researchers recognize as an unambiguous type, and because the date coincides with the beginning of the Coalition Period as defined by Wendorf and Reed (1955). The problem of an end date for Pueblo III is

even more critical for the Santa Fe area than it is in the Albuquerque District. Wendorf and Reed (1955) and Lang (1977b, see also Schwartz and Lang 1972) use A.D. 1325 as the end of the Coalition and the beginning of the Classic Period in the Rio Grande. Although I noted that a more appropriate date seemed to be A.D. 1300 in the Albuquerque District, I do accept 1325 for the Santa Fe area, the latter date accords with the classification being used in the Cochiti area as well (Biella and Chapman 1977). (In his brief overview paper, Lang 1977b, equates the beginning of Pueblo III with the production of Kwahe'e B/w, and therefore assigns a starting date of A.D. 1050 or 1100. Although his classification has merit when ceramics are emphasized, it creates the problem of developing sub-periods to reflect architectural trends.)

Lang (1977a:22) found that by about A.D. 1200, agricultural communities were again established in the Galisteo Basin. Sites are generally near springs or permanent streams. Both pithouses and pueblo-style houses are described. After about A.D. 1250, population in the Galisteo Basin increased considerably and larger population aggregates occurred as well. Aggregated villages consist of rectangular roomblocks that are either contiguous or separate structures grouped around plazas. Masonry and adobe were used in house construction. Kivas are differentiated from pithouses. Corresponding with the increase in population and aggregation of peoples, there is evidence of agricultural features consisting of extensive grid borders on floodplains. Among the representative sites in the Galisteo Basin are Piedra Lumbre Pueblo (LA 309), that has been tree-ring dated to 1251+ to 1333+ (Robinson *et al.* 1973, Lang 1977a:389), and Pueblo Largo which has produced tree-ring dates ranging from A.D. 1230 to the 1290's, (Robinson *et al.* 1973). Santa Fe B/w, was the most abundant type observed on the surface during Lang's survey of Pedra Lumbre. Other ceramics present included "Poge" variety of Galisteo B/w as well as classic Galisteo B/w, and Chupadero B/w. Rio Grande Corrugated appeared to be the most common utility ware. Western trade wares include (Banister 1953) Wingate or Puerco B/r, Springerville Polychrome, and St. Johns Polychrome. Stone and adobe were used in construction. The main roomblock,

which was estimated to contain about 150 rooms (Lang 1977a:392), is rectangular with a small L-shaped wing extending west. Several small roomblocks occur in the immediate area. A complex of boulder and cobble alignments measuring ca. 0.3 to 0.6 kilometers northwest-southwest and 0.6 kilometers northeast-southwest is interpreted as grid borders for soil retention (Lang 1977a:390-391).

South of Santa Fe, tree-ring dates indicate that the pre-Pindi phase jacal structure and pithouse were built at Pindi Pueblo (LA 1) at about A.D. 1200 (Stubbs and Stallings 1953:14, 25). The major construction at Pindi; however, was carried out from the mid thirteenth century, with a date of 1349 for final construction. Local decorated ceramic types from Pindi include Santa Fe B/w, Wiyo, Galisteo B/w, Poge B/w, and Pindi B/w. Western trade wares include St. Johns, and later, Heshotauthla polychrome. Small amounts of Los Padillas polychrome (Glaze A) occurred in the upper levels of the site. Culinary wares included Indented, Tesuque Smeared indented, Cordova Micaceous ribbed and Cundiyo Micaceous-indented. Trends noted in the culinary wares range from sharply defined indentations to smeared and obliterated treatment and greater quantities of mica temper (Stubbs and Stallings 1953:48-56). At Pindi building periods are divided into two major episodes, primarily on the basis of ceramics. The ruin consisted first of irregular pueblo buildings with circular subterranean kivas in front of structures. The kivas lack specialized San Juan features (pilasters, benches, etc), were predominantly circular and subterranean, with an ashpit, firepit and deflector. Rectangular subfloor eists were frequent. Ladder holes and upright posts inside kiva walls are reported (Stubbs and Stallings 1953). Habitation rooms were rectangular and of coursed adobe construction. Firepits in rooms were relatively scarce. Those found, however, were basin shaped, adobe lined and with adobe rims. Firepits were placed near the center of rooms, or, in six cases, had been built along one wall. During the second construction period, the pueblo assumed the form of a large "communal building" with multiple plazas. There was a shift to surface kivas and these roughly D-shaped kivas were less numerous. They were apparently in use when the pueblo was abandoned (Stubbs and Stallings 1953).

Similar sites dating to Pueblo III, in the vicinity of Santa Fe, include Pueblo Alamo (LA 8) (Allen 1973), Agua Fria, Schoolhouse ruin (LA 2, Kidder 1932), Chamisa Locita (LA 4), Lamy (LA 10), Arroyo Hondo (LA 12) (Schwartz and Lang 1972) Cieneguilla (LA 16), Las Madres (LA 25), Upper Arroyo Hondo (LA 76), San Cristobal (LA 80), Rowe or Guthe's Ruin (LA 108), Pena Negra (LA 235), Arrowhead Ruin (LA 251), the oldest part of Pecos Pueblo (LA 625), Manzanares (LA 1104), and in the Galisteo Basin proper, the Waldo Site (LA 9147) (Allen 1973; Keyser and Ewing 1971; Breternitz 1966).

Dickson's (1975) survey in the Arroyo Hondo indicated that during the period ca. A.D. 1200-1250, sites increase in number and size as compared with the preceding period; however, there is no major expansion outside of primary resource areas. During Pueblo III, population aggregates were formed both at Arroyo Hondo (LA 12) and at Pueblo Alamo (LA 8) and the smaller sites were abandoned.

In the Cochiti-White Rock Canyon area trends in Pueblo III settlement parallel those discussed. Biella and Chapman (1977:117) note that research prior to their intensive survey documented 363 Pueblo III sites. They remark that the range in size of Pueblo III sites is considerable, and although small sites of (ca. 6 to 10 rooms) predominate, medium size sites (ca. 11-30 rooms) constitute a class rare at other times in the Anasazi sequence in White Rock Canyon. They mention that population aggregation, which is generally characteristic of the latter portions of Pueblo III in the Santa Fe and Albuquerque Districts, occurs primarily in the northern portion of their study area. Within the permanent pool of Cochiti Reservoir only three single component Pueblo III sites were recorded; a one-room site, a 2-3 room site, and a medium size pueblo of an estimated 17-21 rooms (Chapman and Biella 1977:9). A multi-component Pueblo III site (LA 6462), comprising eight small village units, was excavated by the Museum of New Mexico as part of their work in the Cochiti Reservoir (Allen 1973, Lumbach, Sudar-Murphy, Naylor and Rorex 1977).

Pueblo Medio (LA 5014), the medium size Pueblo III site in White Rock Canyon within the permanent pool of the reservoir, consisted of two roomblocks. The larger

western roomblock contained 12 tiered contiguous rooms and the eastern three contiguous linearly arranged rooms. Each roomblock is reported to have had an associated but not contiguous kiva. A third, smaller, circular subterranean structure, connected to the western roomblock is described as either a kiva or pithouse. Rooms were rectangular with basalt clasts used as the base for coursed adobe walls. Interior hearths varied in location within rooms and in form. Ceramics from the site were predominantly Santa Fe B/w, with small amounts of Galisteo B/w and Wiyo B/w. Although the excavators believe Pueblo Medio was occupied on a year round basis, they question the degree to which agriculture was practiced. Doubt stems from the observation that the soils in the immediate vicinity are considered of low agricultural potential today. Further no corncobs or kernels were recovered during the excavation, and no mealing bins were discovered although there were slab metates (Lumbach, Sudar-Murphy, Naylor and Rorex 1977).

The majority of reports dealing with Pueblo III in the Santa Fe District have been concerned with tracing the origins and development of the various ceramic types found in (and on) sites. Pueblo III is given slightly different temporal boundaries by different scholars, depending upon whether sites show a predominance of Kwahe'e or Santa Fe B/w, or whether there are sherds of Wiyo, Galisteo, western polychromes or early glazewares as well. Summaries (such as those provided in Wendorf and Reed 1955, Stubbs and Stallings 1953, McNutt 1969 and Lang 1977b) generally indicate a considerable diversity in the size, ceramic content, and location of Pueblo III sites, but the major efforts seem to concentrate on an attempt to order this diversity along temporal lines. The fact that no ordering is acceptable to all researchers is probably the most instructive feature of the summaries. General agreement is limited to the propositions that, after the sparse indications of habitation during Pueblo II, population seems to have increased and toward the end of Pueblo III population aggregation also increased. The current favored explanation for aggregation is that it is a response to subsistence stress, possibly initiated by decreased amounts of rainfall (cf. Wendorf and Reed 1955, Biella and Chapman 1977, Chapman and Biella 1977, Snow 1971).

Pueblo IV in the Santa Fe District may be dated to between A.D. 1325 and 1600, a time period that coincides with the dates proposed for the Rio Grande Classic by Wendorf and Reed (1955). A terminal date of 1540, used by Lang (1977a, 1977b) is not accepted here for reasons already discussed. The Rio Grande Classic has been characterized as a period of "cultural expansion and florescence" with large aggregated communities and elaborate material cultural items (Wendorf and Reed 1955:153). Among diagnostic artifacts, Wendorf and Reed (1955:153) list decorated pipes, elaborate axes, carved bone tools, stone effigies, mural paintings and variety in vessel forms. Lang (1977b) adds the appearance of a "Rio Grande" art style, depicting masks and masked figures. He follows Schaafsma and Schaafsma (1975) in regarding this style as an introduction by populations of Jornada Mogollon derivation and possibly representing the introduction of the katchina cult. The period may also be characterized by considerable locational shifts in population.

Shortly after A.D. 1300, red-slipped, glaze decorated ceramics began to replace black-on-white wares over much of the Santa Fe District. Presumably, the Rio Grande glazes were initially made in imitation of earlier western trade wares, such as St. Johns Polychrome and Heshotauthla. The Rio Grande glazes form a distinctive set of ceramic types which were produced as late as ca. A.D. 1700 and widely traded both within the Rio Grande Valley and to groups on the Plains. Some of the major contributions to the study of the glazes appear in the following: Nelson (1916), Kidder and Shepard (1936), Mera (1933) and Shepard (1942). Shepard's work, which utilizes petrographic analysis of temper is particularly important in the establishment suggested manufacturing and trade centers. Warren (1969, 1970, 1977b, 1977c) is continuing this analytic technique and interpretation. In the Jemez, Pajarito, and Chama areas, carbon painted black on white wares, such as Wiyo B/w, and later Biscuit A and Biscuit B, continued to be manufactured.

Warren (1970:4) suggests that the Cochiti area was a major trade center for the earlier glazes (Agua Fria and San Clemente) from about A.D. 1325 to 1400, that San Marcos and other Galisteo Pueblos became centers for trade in Cieneguilla G/y,

Cieneguilla G/p, Largo G/y, G/p and Espinosa G/p from A.D. 1350 to 1475, with San Cristobal Pueblo a possibly major trade center for glazes C to F from A.D. 1450 to 1680.

Within the Galisteo Basin early Pueblo IV has been referred to as the Galisteo phase, dated from about A.D. 1300 to 1350 (Lang 1977a:24). At first, there seems to have been continued growth in several of the late Pueblo III villages distributed from the eastern Basin toward the mouth of San Marcos Arroyo. San Marcos Pueblo was founded, and, as noted above, was apparently an exchange center. In the later part of the Galisteo Phase (ca. 1330-1350), there were population discontinuities and disorganization, evidenced by the observations that many of the early Galisteo Phase sites were abandoned, villages were established in areas which may have offered more reliable water resources, and the export of ceramics from the Basin to pueblos both north and east seems to have been disrupted (Kidder and Shepard 1936, Lang 1977a:24). Between about A.D. 1350 and 1475 large pueblos were founded on Galisteo Creek and its tributaries. Such well-known sites as San Cristobal, Piedra Lumbre Pueblo, Pueblo Largo, Las Madres and San Marcos were occupied throughout the period; however, Lang (1977a:399-401) suggests that Pueblo Largo and San Cristobal may have experienced a period of population decline at about A.D. 1350 and, later, a population increase. His interpretation is based on evaluation of Nelson's (1916) stratigraphic tests at San Cristobal and paleoclimatic data derived from tree-ring reconstruction for the northern Rio Grande.

Lang (1977a:26) remarks that a pattern of dispersed field houses and farmsteads seems not to have existed in the Basin, after about A.D. 1370 and correlates the aggregated village pattern with the construction of large retaining dams and reservoirs. In any case, there is a marked decrease in relatively small settlements, accompanied by population aggregation, but correlations with specific drought episodes are not well-documented. The Wheeler Site (LA 8669, Alexander 1971) is a fairly small (about 30 rooms) pueblo on a ridge above the Galisteo River. It was built in A.D. 1386, occupied for a short period of time, abandoned and burned. Whether or not its abandonment can be

attributed to an inferred drought in ca. A.D. 1425 is conjectural. It is worth noting that Lang (1977a:403) believes that many of the walled rock shelters which he located in the San Cristobal survey may date to mid to late Pueblo IV and may have been used for storage. A possible inference is that aggregation of population and labor investment in water control and storage features was, in part, precipitated by unreliable crop yields brought about by moisture deficiencies.

Nelson's (1914) descriptions of the ruins of the Galisteo Basin are classic and highly accurate. In addition to discussing the large villages or towns, Nelson recorded rock art sites, shrines, small pueblos, field houses, reservoirs and dams. Many of the large Galisteo sites were multi-storied pueblos built of either stone and adobe or masonry. Roomblocks are massed about plazas, some of which are completely enclosed; others are open. Circular kiva depressions are noted in plaza areas (Nelson 1914). Schroeder and Matson (1965) provide descriptions of the Galisteo villages reported and chronicle by the Spaniards.

Within the White Rock Canyon - Cochiti area the majority of the Pueblo IV sites are characterized by early glazes (A and B), indicating that occupation of the area continued until only about A.D. 1450; documented Pueblo IV sites number 322. Biella and Chapman (1977:305-306) remark a number of differences between the Pueblo III and Pueblo IV sites in their study area. These are: a reduction in total population suggested by a decrease in both Pueblo IV components and number of rooms; a change to a bimodal distribution in site size; increased variability in the specific types of topographic locations of Pueblo IV components; an increase in the number of sites with non-structural components (lithic and/or ceramic scatters), and an increase in agricultural facilities, including dams and terraces.

Bandelier (1892) described many of the large Pueblo IV sites near Cochiti. Most large villages are on the broad mesa top above the right bank of the Rio Grande. Stein (1976) notes that these are spaced several kilometers apart, apparently in order to maintain access to water sources while providing enough land for farming the mesa tops. Small structural sites

(field houses) occur between the large sites on the mesa. Within the canyon, one and 2 room structures predominate.

Recently reported excavations of Pueblo IV sites include LA 6455, LA 70, LA 5137 and the east component of LA 12579 (Lange 1968, Chapman and Biella 1977, Snow 1973, Stein 1976). The Alfred Herrera Site (LA 6455, Lange 1968) was on a bench above the right bank of the Rio Grande, and comprised two architecturally distinct sectors, both of which date to Pueblo IV. Architectural features consisted of surface rooms, pit rooms and kivas. Pit rooms were the prevailing house type in the eastern, somewhat earlier, sector of the site. These averaged over a meter in depth and were rectangular habitation rooms with ventilator openings oriented between east and south. Walls were of coursed adobe or irregular stone blocks. Nelson described pit rooms at Los Aguajes (LA 5, Lange 1968:73-78). Kiva form was roughly circular with firepit, ashpit, deflector and ventilator. The kiva in the eastern sector of the Alfred Herrera site had a high bench along the southeastern portion of the wall (Lange 1968:76-90).

Although analysis of recently excavated one and two room structures within White Rock Canyon are not yet completely reported, these sites seem to contain little fauna, few or no milling stones and little botanical debris. Utility ware is generally sparse, but hearths are present. Walls commonly are represented by a single row of stone (Chapman and Biella 1977, Jan V. Biella 1978, personal communication). Agricultural terraces composed of rocks one or two layers high indicate little labor investment. An apparent water diversion device, consisting of slabs set upright into a terraced area, also seems to have involved minor labor expenditure (Stein 1976, Chapman and Biella 1977).

In the Santa Fe River Basin in the immediate vicinity of Santa Fe, two Pueblo IV sites have been excavated. LA 16, (Cieneguilla Pueblo) was excavated by Nelson in 1915, although no final report was written. Pindi Pueblo, discussed above, continued to be occupied into Pueblo IV times and is reported by Stubbs and Stallings (1953). Surveys in the Santa Fe area in general, have been sporadic and poorly reported. Two recent surveys (Klausner 1977, Dart 1977) recorded nine

sites, which on the basis of surface ceramics, appear to have Pueblo IV components.

Dickson's (1975) transect survey in conjunction with the excavation of Arroyo Hondo (Schwartz and Lang 1973) indicates an increase in the number of sites during Pueblo IV to levels previously indicated for the phases prior to A.D. 1300. Although many of the sites are probably small field houses rather than habitations, there is an overall increase in site size implying expanded population density. Sometime during the middle Classic the Arroyo Hondo area was again depopulated, but population seems to have shifted to Tetilla Canyon and the western face of La Bajada Mesa (Schwartz and Lang 1972). Dickson (1975) indicates that resource zones were abandoned sequentially, with the poorest zones depopulated first. A general discussion of approaches to abandonment is deferred to the following section.

The early Spanish exploratory expeditions (see Map 7 p.) found the middle Rio Grande between Taos and Belen densely settled with Pueblo villages. Most of the settlements were described as large, compact towns, although small seasonally occupied settlements were located near fields at some distance from the towns. Apparently, Apache groups in the neighboring mountains frequently wintered among the Pueblos (Abbink and Stein 1977:150, Lange and Riley 1966:263). Onate founded the first administrative capital at San Gabriel de Yunque, near San Juan Pueblo in 1598; but the capital was relocated at Santa Fe in 1610. The early Spanish settlers were representatives of either the military government or the church, and the number of "colonists" was actually quite small. Seventeenth century land grants were made to a number of Spanish families, and some haciendas were established near Indian lands. Abbink and Stein (1977:155) believe that LA 34 and LA 591 in the White Rock Canyon - Cochiti area were two such early haciendas. They were heavily fortified. The major impact of Spanish rule at this time seems to have been the taxation of Indian labor and disruption of the normally peaceful trade between the Pueblos and the Apaches (Abbink and Stein 1977:155-156). During the Pueblo Revolt of 1680 the Cochiti and some of their allies from Santo Domingo, San Felipe, Taos, Picuris and San Marcos

joined the Navaho and Apache in refugee communities on the Potrero Viejo. Old Cochiti (Kotyiti, LA 295) was built as a refugee community. Other Pueblos moved further west to join the Hopis and Navajos. During the 12 years of independence from Spain, the Pueblos resumed subsistence farming activity but retained European crops, horses, sheep and cattle (Abbink and Stein 1977:156, Forbes 1960:265, 267, Judge and Flynn 1973:6).

During the reconquest, Old Cochiti (Kotyiti) was burned in April 1693 by de Vargas, in order to force the Indians to return to their more easily administered homes along the Rio Grande. In the abortive Pueblo Revolt of 1696, refugees from Cochiti again occupied Old Cochiti. When threatened by the arrival of Spanish troops, these refugees fled further west and joined the Navajo and Acoma. The Keresan Pueblo of Laguna was probably founded in 1697 by the group which had fled to Acoma (Forbis 1960:265, Abbink and Stein 1977:156).

PAJARITO PLATEAU

This district encompasses the relatively high mesa country that slopes from the Jemez Mountains eastward to the Rio Grande. The northern boundary is roughly at Santa Clara Creek and the southern at the Jemez River. The major late Anasazi ruins were documented in early surveys and excavations of Bandelier (1892), Hewett (1905, 1906, 1908, 1909a, 1909b, 1938), Hendron (1940, 1945), Morley (1910), and Wilson (1916, 1918). The work of Holmes (1903) and Reiter (1938) in the adjacent Jemez Mountains is also relevant. Until recently, nearly all effort concentrated on the ruins of the Coalition and Classic Periods, and the literature, unfortunately, reflects this bias. Bousman, Larson and Levine (1974) provide an excellent annotated bibliography of available reports.

Although meagre, there is evidence that the district was used prior to ca. A.D. 900. Surface finds, that are ambiguous evidence at best, include an isolated Folsom point on the mesa north of Ancho Canyon (Steen 1977:7), and Archaic points. Of the latter, Steen (1977:6-7) reports that those found within Los Alamos lands are late Archaic and resemble San Jose points. Walsh, Orcutt and Hill (1978) record lithic

scatters and a Jay point within the Santa Fe National Forest. More reliable data relating to early occupation have come from Ojala Cave (LA 12566) in the lower Alamo Canyon area (Traylor et al. 1977). This site is a rock shelter 50 feet west of the present course of the Rio Grande and one mile north of the southeastern boundary of Bandelier National Monument. Intermittant use from late Archaic to Pueblo IV times is evidenced in the cave with grinding tools present throughout the seven occupational levels identified. The first level was badly eroded, and the second produced no diagnostic artifact types; however, the third occupation level yielded a projectile point of Chiricahua Cochise type. Sherds recovered from this level seem to be intrusive. A radiocarbon date of B.C. 1750 \pm 70 was obtained. Occupation 4 yielded artifacts identified as Chiricahua Cochise and as San Jose/Armijo. One Wiyo and six San Clemente G/p sherds again seem to be intrusive, because radiocarbon dates of B.C. 650 \pm 145 and B.C. 590 \pm 75 were obtained; corn also was associated with Occupation 4. Although Traylor et al. (1977) consider that the Pajarito Plateau, because of its geographic position, is likely a mixing of Cochise and Oshara traditions and states that more data are necessary in order to establish their temporal relationships, it is noteworthy that the Pajarito sequence as known from Ojala Cave is the reverse of the sequence postulated for the Galisteo Basin (Lang 1977a). The implications of the reversal are interesting, because Lang (1977b) suggests that corn, and perhaps reliance on agriculture, were introduced from the south, presumably by Cochise migrants. Irwin-Williams (1973) believes corn was accepted into a well-established, distinctive, northern pre-Anasazi base. As I remarked above, the interpretation of projectile point variability in terms of cultural identity is premature until the relationships among functional, contextual and morphological variation are better understood.

Occupation level 6 of Ojala Cave yielded a hearth encircled with stream cobbles, a dry-laid rubble wall with a possible post-hole, a deep basin metate, two chert blades and seven (apparently intrusive) sherds. Although the "cultural identity" ascribed to this occupation is given as "Basketmaker II, III, San Pedro Cochise, En Medio, Oshara" (Traylor et al. 1977:117);

there does not seem to be enough material to warrant much confidence in this identification.

While no excavated sites on the Pajarito Plateau can be attributed to the Late Basketmaker - Early Pueblo Period, Steen's (1977:7) statement that it was not until the late 13th century that "the unpopulated Pajarito had an influx of puebloan settlers" is in error. LA 12119, LA 12121 (Traylor et al. 1977:495) and Salt Bush Pueblo (Snow 1974) date to a slightly earlier period. LA 12119 is located at an elevation of 5420 feet on the talus slope on the east side of Alamo Canyon. The site comprises 23 rooms arranged in a rectangular block of 17 rooms, with a row of six rooms extending eastward from the center. Walls are of tuff masonry on "sandy plaster" foundations (Traylor et al. 1977:15). Three of the rooms are identified as kivas, and these, in addition to nine other rooms, contained floor features. Hearths are circular and plaster lined. Subfloor bins and cists were found in two rooms. Two of the kivas are circular. Kiva 1 is circular with a southern recess and ventilator excavated to 14 cm above the floor. A bench just over a meter in height and composed of river cobbles was found along the north and northeast side of the kiva. Floor features consisted of a hearth, rock and plaster deflector, and a probable rectangular ashpit oriented approximately north-south. Kiva 3 apparently was originally circular, and later was modified into a D-shape. It is connected by a doorway to one of the rooms. Since the sipapu apparently is associated with the earlier round kiva and was located under the south wall of the later, modified structure, it would seem to be difficult to ascertain whether the D-shaped structure is more appropriately referred to as a kiva or a pit room. (Not having seen it, I rely on the excavators' judgments.)

The designation Kiva 2 was given to a semi-subterranean rectangular room on the southwest corner of the pueblo. A tunnel-shaft ventilator was located in the center of the south wall. Floor features consisted of a hearth, deflector, depression that might have been an ashpit, and a sipapu. The pueblo was not constructed as a single unit at one time nor were all three kivas in use at the same time (Traylor et al. 1977:23-27). Both tree-ring and archaeomagnetic dates were obtained from the

site. The former range from A.D. 1191vv to 1419vv. The archaeomagnetic dates range from 1180 + 22 to A.D. 1250 + 45 (Traylor et al. 1977:495-496). Slightly more than 83 percent of the decorated sherds at LA 12119 are Santa Fe B/w, while Wiyo B/w, Kwahe'e B/w and Galisteo B/w occur in minor amounts. Los Lunas Smudged, Agua Fria (Glaze A), White Mountain Redware, Mancos B/w, Socorro B/w, Cieneguilla G/y, and McElmo B/w are each represented by a few sherds. The culinary wares include 91 percent Tesuque Smeared with Plain and Indented corrugated wares making up the rest (Traylor et al. 1977:328).

LA 12121 is an eight room pueblo, aligned east-west on the talus slope across the bifurcated mesa separating Lummis and Alamo Canyons. The site is opposite to LA 12119. LA 12121 is similar in construction and features to LA 12119, with one "corner kiva" similar to that described for Forked Lightning Ruin near Pecos (Kidder 1926a). Most sherds were again Santa Fe B/w with Kwahe'e B/w next in frequency, though only about 20 percent as common. Galisteo B/w, White Mountain Redware, Socorro B/w, Mancos B/w, Agua Fria G/r and Penasco Micaceous are each represented by from 1 to 5 sherds. The predominant culinary type again is Tesuque Smeared (Traylor et al. 1977:28, 337). Two cutting dates of A.D. 1177 were obtained from the site. The range of twelve tree-ring dates is from A.D. 1149v to 1177r, while an archaeomagnetic date from room seven is A.D. 1180 + 13 (Traylor 1977:496).

Saltbush Pueblo (LA 4997) is in Frijoles Canyon, fifty meters east of the administrative headquarters of Bandelier National Monument (Snow 1974). The site contained 11 rooms; 9 were aligned north-south, and a kiva was situated off the northwest corner of the roomblock. Two contiguous rooms were attached to the south wall of the kiva's southern recess. The construction of Saltbush Pueblo is similar to that of LA 12121 described above and like it was apparently modified once. Snow (1974:32-33) discusses the site in terms of two building components. The earlier component consisted of a unit-type surface structure adjacent to the west wall of a simple circular Rio Grande kiva with east-west oriented floor features. The unit-type structure consisted of four long

rooms with floor firepits against the walls of two of these. Two contiguous rooms, which lacked firepits, formed a western "tier." In the second building phase, the kiva was modified by the addition of the southern recess and a realignment of the kiva features north-south. Rooms of the original structure were remodeled by constructing dividing walls across the short axes of three of the four long rooms and adding two surface rooms. A single firepit was associated with the remodeled pueblo. Tree-rings from non-structural wood yielded dates of 1194 vv, 1215 vv, and 1241 vv. Two archaeomagnetic dates from the kiva firepits are A.D. 1190 + 10 for the original (east) firepit and A.D. 1230 + 20 for the second (south) firepit (Snow 1974:33).

Ceramics from Saltbush Pueblo essentially mirror those of the sites described above; Santa Fe B/w makes up about 82 percent of the decorated wares, Galisteo B/w 11 percent, Wingate/Puerco B/r, Kwahe'e B/w, Wiyo B/w, Bandelier B/g (Biscuit B), and Rio Grande glazes are each represented by a few sherds. Indented Corrugated and Clapboard Corrugated comprise most of the culinary sherds, with some plain surfaced varieties and striated sherds occurring (Snow 1974:36-40). Except for the few White Mountain Redware sherds, the ceramics are indigenous to the area; an analysis of temper types indicated that those which could be identified were available within the middle Rio Grande area (Snow 1974:36, 43). Grinding tools and points occurred in the fill of Saltbush Pueblo, but the number and variety of faunal remains is surprisingly low and limited. The most numerous animal represented (on the basis of Minimum Numbers of Individuals) is turkey. Deer, pronghorn, jackrabbit and cottontail (in addition to smaller animals) are present in very small numbers. As Snow (1974:63, 66-67) points out, this is in marked contrast to Rainbow House (Caywood 1966) which is only about 400 meters east but was occupied between about A.D. 1400 and A.D. 1500. Rainbow House contained not only a more diverse mammalian fauna but a great variety of birds including migratory waterfowl, hawks, eagles, grouse and quail.

Snow (1974:68) comments that the kivas found in small Coalition Sites on the Pajarito Plateau are either circular and

incorporated into roomblocks or absent altogether. He refers specifically to LA 8681, LA 4632, LA 4631, LA 4628, LA 5100 and LA 3653, the data for which appear in Maxon (1969), Worman (1967) and field notes on file at the Laboratory of Anthropology, Museum of New Mexico. Against this background, he examines the Mesa Verde immigration to the Rio Grande during the mid to late thirteenth century suspected by archeologists on the basis of specific items such as Galisteo B/w:

The addition of the southern recess to the kiva at Saltbush is the kind of evidence that has been sought to support the suspected Mesa Verdean movement. The recess can be considered prima facie evidence for Mesa Verde influence at the site, but the overall impact of the formal content (and the ceremonial connotations, if any, of the formal content) of the keyhole kiva was short-lived and, apparently not significant (Snow 1974:69-70).

In this context, it is worth reiterating that the more recently excavated LA 12119, discussed above, also has a southern recess, north-south orientation of floor features and, additionally, a high bench in kiva 1. The hearth from this kiva yielded an archaeomagnetic date of A.D. 1180 + 40 (Traylor et al 1977:495). Although I discuss both the evidence for migrations and the timing of these events in the Assessment section, it is important to clarify at this point that Snow is not referring influence brought about by the final abandonment of Mesa Verde, which occurred at about the end of the 14th century. Rather, he refers to an apparent depopulation of Mesa Verde which Hayes (1964) suggests for the Mancos phase or the McElmo/Mancos transition. An evaluation of contemporary events in Chaco Canyon are significant as well.

Although investigators from Hewett (1906) to Steen (1977) have employed different criteria to categorize the sites on the Pajarito Plateau (which, naturally, makes comparison difficult), there seems to be general agreement that "the most numerous sites are those with one or two rows of rooms at which the predominant pottery type is Santa Fe Black-on-white" (Steen 1977:31-32). A list of these sites which lie

within LASL land is given in Steen's (1977:32-33) publication and brief descriptions of those which were excavated between 1950 and 1974 are presented as well.

The Santa Fe Black-on-white sites though more numerous than the later larger Classic sites, are not well-known. They are occasionally referred to as "farmsteads," but data available do not permit confident evaluation of how many of them were occupied contemporaneously, how many were used year round, or the range of variability with respect to architectural details, dates, artifact inventories, faunal or botanical remains and locations. This situation is surely one which should be rectified before we can have much confidence in cultural historical reconstructions of the Pajarito specifically or the middle Rio Grande in general.

Steen (1977:8) suggests that at some unknown time the small Santa Fe sites began to expand in size, double or triple rows of rooms being formed. A further "development" was the building of room-blocks around a plaza which often contained a detached kiva. Although Steen (1977:8) states that the most common Black-on-white pottery at these sites is Santa Fe and Wiyo, and cited Rainbow House (Caywood 1966) as an example, Biscuit B was by far the most numerous B/w type excavated at Rainbow House, with Biscuit A second, and only minor amounts of Santa Fe present (Caywood 1966:20). Twenty tree-ring dates obtained from Rainbow House date between A.D. 1421 and A.D. 1453, indicating that it was contemporary, in part, with the very large sites of Tshirege (LA 170) and Tyuonyi (LA 82).

Most of the Classic period sites on the Pajarito are inadequately dated, and it is likely that many have Coalition components. Tree-ring dates given by Robinson, Hannah and Harrill (1972) for Bandelier Group M, cavate and talus rooms in Frijoles Canyon, suggested construction in 1394; Tyuonyi, Frijoles Canyon, late 1300's to the early 1500's; Rainbow House, Frijoles Canyon, 1421 to ca. 1453, Frijolito Ruin, on the mesa above and south of Frijoles Canyon, about 1400 or 1450; Tsankawi, on the mesa top on side of Pueblo Canyon, mid to late 1400's. In

addition, Caywood (1966:15) proposes dates of 1422-1581 for Tshirege, 1527-1562 for Puye, and 1431 to 1447 for Frijolito.

Hewett's (1906, 1938) descriptions and drawings of the Classic ruins are an excellent reference. He listed 26 ruins (which include those discussed above). Steen (1977:13-14) distinguishes "Plaza Sites" from "The Big Sites," suggesting that the former were contemporary with the earlier phases of construction at the Big Sites. Although there are not enough tree-ring dates to fully substantiate the claim of temporal priority, the division does parallel that used by Hibben (1939) for the Chama as well as the one used in this report. The Plaza Sites of the Pajarito are of stone masonry and consist of roomblocks around a central plaza. Entry to the plaza generally is on the east and is a small opening. The plaza contains a circular kiva; a second kiva is frequently outside the pueblo structure on the east side south of the entry to the plaza. One of the enclosing roomblocks is generally dominant, probably being multi-storied. Stein (1977:33) lists 21 "Plaza Sites" by LA number. Several were illustrated by Hewett (1906). The Big Sites are Tshirege, Otowi, Little Otowi, Tyounyi, Tsankawi, and Navawi. Hewett, again, (1906) illustrated and gave dimensions for each of these. Tsankawi and Tyounyi maintain a plaza-type configuration. As Steen (1977:14) states, the others consist of massive roomblocks arranged around three sides of a plaza area open to the south. He notes that they are at generally lower elevations within the Pajarito Plateau.

Cavate dwellings, carved out of the soft Bandelier tuff formations, occur in numerous localities but on south or southeast facing cliffs only. Reservoirs are present at some of the large ruins, as indicated by Hewett (1906). Steen (1977) does an admirable job of describing the rock art, which is abundant and in late Rio Grande style; as well he records game traps, shrines, and trails. Finally, agricultural features known for the area consist of check dams across drainage channels and irregular irrigation terraces (Steen 1977:34).

From the perspective of culture history, the Classic sites of the Pajarito are interpreted from slightly different perspectives.

The more or less standard version (Reed 1950, 1951, Wendorf and Reed 1955, Ellis 1964) is the view that the expansion of population represents the immigration of substantial numbers of people from the San Juan Basin. Steen (1977:40) suggests indigenous population growth and subsequent aggregation. In both cases, investigators rely on a selective set of traits, emphasizing either ceramics or architecture and site placement. A slightly different approach is discussed in the Assessment section below.

ASSESSMENT OF THE ANASAZI CULTURAL SYSTEMS

The foregoing accounts of the prehistory of the middle Rio Grande Valley by cultural district reflect several considerations. First, for those working with small land holdings or Forest Service Ranger Districts, there is enough detail to provide background for the evaluation of specific projects and assess the potential significance of individual archeological sites. Second, the detail provides a guide to relevant existing literature. Third, the cultural district approach is a reflection of existing literature and on-going research. The emphasis on ceramics and architectural details indicates current investigative bias. Most archeologists today seem to work within very narrow frameworks and do not see beyond the immediate area (or time period) within which they work. The lack of a synthetic view is apparent in nearly all recent field reports in that descriptions of ceramic types and architecture make up the bulk of the report; critical data such as reports of faunal and botanical remains, paleoenvironmental reconstructions and reports of skeletal material are often relegated to appendices. In effect, the district accounts indicate the scale at which most research is conducted today. In terms of providing an understanding of the dynamics of Anasazi adaptations, this scale is not necessarily meaningful, because it is not comprehensive. I do not suggest that future research be carried out at this level of integration (or fragmentation). Recently I was asked if the Middle Rio Grande "made sense" in Anasazi prehistory. My answer was that the region considered as an independent entity did not but that it did seem to make some sense in terms of the prehistory of the Southwest. With this in mind, I focus this section on a discussion

of Anasazi demography, economy, settlement systems and social organization from what I hope is a reasonably broad perspective.

It has been noted that archeological effort over the past hundred years has been directed, in part, toward tracing the origins of particular features ("traits") found in the Rio Grande area. Research efforts and various syntheses of the Rio Grande reflect a preoccupation with comparison to the San Juan Basin, which for various reasons has been considered the Anasazi "heartland." The most important reasons for this are that, until recently, the earliest known Anasazi sites (Basketmaker II) were found in the Durango area of Colorado (Morris and Burgh 1954) and that cultural events in the San Juan basin during Pueblo III produced remains which are more elaborate than anything known for the Rio Grande. These two features account for the Rio Grande area having been consistently viewed as "marginal." As I have pointed out, recent research in the Albuquerque district and in the Cimarron negates the interpretation of the San Juan as the original Anasazi homeland. In order to evaluate the "marginality" question, it is worthwhile at this point to sketch developments in the San Juan (particularly the Chaco Area) during Pueblo III. Prior to Pueblo III, it should be noted, the Chaco area is not particularly different from anything else in the Anasazi southwest (Judge 1976).

Pueblo III in the Chaco Area

Within the Chaco Canyon region the complexity of Pueblo III may be appreciated by examining the types of villages present, details of the Great Kivas, fields and irrigation systems, roads and trails, and small items of material culture. The villages consist of two distinctive kinds of sites, referred to as Hosta Butte Phase villages and Bonito Phase towns. This terminology is awkward, because "phase" is a term which has temporal implications. It is used here to conform to the published literature, even though the two "phases" were contemporary. Hosta Butte sites differ little from Pueblo II sites in Chaco Canyon. They average about 10 rooms in size, and are single story structures.

Walls are of somewhat irregular masonry, and the arrangement of rooms is rather amorphous. Great Kivas, discussed below, are not associated with Hosta Butte sites, although a single Great Kiva, such as the one at Casa Rinconada, may have served several of the small Hosta Butte communities. Hosta Butte sites are distributed on both the north and south sides of Chaco Canyon. Recent estimates suggest that about 2890 people may have been living in Hosta Butte villages in an area of 43 square miles of Chaco Canyon National Monument (Hayes 1975:57).

The Classic Bonito sites, sometimes referred to as towns, are distinctive in being large multi-storied structures, with an average of 288 rooms (Hayes 1975). Pueblo Bonito, the largest, had an estimated 800 room; parts of this structure were five stories high. Chetro Ketl had an estimated 500 rooms, and the estimate for Pueblo de Arroyo is 284 rooms. Sites outside Chaco Canyon proper, but that are Classic Bonito in style, include Salmon Ruin, with an estimated 290 rooms, and Pueblo Pintado with 185 rooms estimated (Judge 1976). Hayes (1975) considers that about 2760 people may have been living in the Bonito towns during Pueblo III. In addition to larger size, the Bonito towns were "planned" structures with interior courtyards and Great Kivas incorporated within the towns. Bonito sites are characterized by large rooms, and elaborate cored masonry, often with decorative wall veneers.

Great Kivas are distinctive in size and the elaboration of floor features. For example, the Great Kiva at Casa Rinconada has a diameter of about 63 feet; the same type of structure at Chetro Ketl measured about 55 feet in diameter (Vivian and Reiter 1965). These structures are largely subterranean, so that the amount of labor invested in their construction was tremendous. Antechambers are commonly associated with Great Kivas; entry was either through recessed masonry stairways from the antechamber or from the antechamber by ladder. Floor features include square raised fireboxes located on the central axis but slightly south of the center of the round room, deflectors that were either masonry or wooden wickerwork. Roof supports were four masonry columns or four massive timbers. At Chetro Ketl, each pit for seating the roof support

timbers contained four sandstone disks, probably to help support the great weight of the roof. Paired raised masonry "vaults" are located on each side of the floor paralleling the main north-south axis. Depth of the Great Kivas are sometimes difficult to establish, because the original wall height is not known, but Judd (1922:15-16) estimated that the wall of a Great Kiva at Pueblo Bonito was 11 feet high. Wall niches or crypts are common features of these structures, but only at Chetro Ketl II were the crypts sealed with masonry. The ten wall niches at Chetro Ketl II were found to contain strings of beads and pendants (Vivian and Reiter 1965).

Details of the irrigation and field systems in Chaco Canyon have been described recently by Vivian (1970, 1974). Importantly, these depended on water from runoff from the mesa top above Chaco Canyon and not from diverting water from Chaco wash (that at least today, is deeply entrenched). According to Vivian (1974), runoff was channeled from rincons by diversion dams and canals to multiple headgates, then by canals and ditches through bordered gardens. After irrigating the bordered gardens, any excess water was drained into Chaco wash. The amount of land irrigated by this method is difficult to estimate. A bordered garden at Chetro Ketl comprised only about 4.8 hectares. Thus, a great amount of effort was expended constructing water control devices which did not in fact provide a great deal of irrigated land. More important, it is not likely that there is enough arable land in Chaco Canyon to support the prehistoric population during Pueblo III.

Elaborate systems of roads and trails have been well-documented recently through aerial photography and ground checking (Lyons 1976). These, like the irrigation features, are difficult to date, but their physical proximity to Bonito Phase sites, indicates that they were constructed during Pueblo III. The roads radiate out from Chaco Canyon, and not all have been ground checked for their entire length. They are distinctive features in being virtually straight lines, not contoured to topographic relief. When they change direction, this is accomplished by making a sharp turn, instead of curving. Some of the roads are lined with masonry curbs,

others are visible today only as slight swales on the landscape. Although some of the roads are fairly narrow, others are up to nine meters in width. It has been suggested that shrines along these roads may have served as signaling stations (Hayes 1975:75; Hayes and Windes 1975). Certain roads lead from Chaco Canyon to outlying Chacoan Pueblos, such as Pueblo Pintado, but others seem to lead to very small Bonito style "outliers" of only a few rooms that were apparently in close proximity to good agricultural land.

Items of material culture from Hosta Butte and Bonito Phase sites are generally similar, however, a variety of impressive luxury items were found only at the Bonito Phase sites. These include cylindrical vases, copper bells, quantities of turquoise, mosaics, inlay pieces and macaw skeletons. Finally, although burials have been recovered from trash deposits at the Hosta Butte Phase sites, burials from the Bonito Phase sites are both extremely rare and when found were in abandoned rooms or beneath floors (Vivian 1970).

Various reasons have been offered for the rapid development of Pueblo III at Chaco, as well as for the differences between Hosta Butte villages and Bonito towns. The idea that the classic towns represent a gradual development from the smaller Hosta Butte Phase sites is not supported by the data indicating that the two were contemporary. Vivian (1970) suggested that the two kinds of sites represent the same cultural group with two different forms of social organization. He relates the status items and elaboration present in the Bonito sites to their proximity to the irrigation system, and argues that the control and maintenance of the irrigation devices relate to a restructuring of portions of the society along more highly complex lines. Specifically, he suggests that the Bonito towns may have had dual divisions (moieties) similar to those of modern Rio Grande Pueblos. Dual divisions are held to provide a more formal structure for labor organization than the clans of the Western Pueblos.

Ferdon (1955) presented the notion that the Bonito towns resulted from the presence of Mesoamerican merchant-traders, perhaps operating from a base in the Zacatecas or Durango areas. The idea is elaborated by Di Peso (1974) based on his

work in the Casas Grandes area of Northern Mexico. Several Mesoamerican states developed long distance trade networks. Among the Aztec a special class of people, referred to as Pochteca acted as long-distance traders, middlemen and sometimes spies. Enjoying political immunity, they traversed Mesoamerica. The Aztec, of course, ruled Mexico long after Casas Grandes and Chaco Canyon had been abandoned, but the idea of Pochteca serves as an analogy. Thus, it is suggested that a state government in Mesoamerica may have established bases for trade operations among the Anasazi at Chaco Canyon. Presumably, few actual Mesoamerican emissaries would have been involved, but their presence, and the opportunities for trade, would have encouraged the local Anasazi populations to adopt some of the sophisticated technological (and possibly ceremonial), features available to the more highly developed Mesoamerican states.

In any case, the Classic Pueblo III occupation of Chaco Canyon appears to have been relatively short lived. Although it is difficult to establish precisely when the population began to decline, or when the major ruins were abandoned, Hayes (1975) suggests a terminal date of about A.D. 1200. Following this, he believes there was an incursion of people from the Mesa Verde area, and inferred this from architectural features, such as compound walls of large shaped blocks of sandstone and Mesa Verde keyhole shaped kivas. Site Bc 236 (Bradley 1971) constitutes a good example of this style. The site consisted of ten rooms and a kiva, the latter with a keyhole modification. Previously existing sites also show some architectural renovation during this period. Thus, there was construction at New Alto, Kin Kletso, Casa Chiquita and Pueblo del Arroyo (Vivian 1959, Hayes 1975:59). Outside of Chaco Canyon, Aztec Ruin is an excellent example of Mesa Verde modification (Morris 1921). The late Pueblo III Mesa Verde affiliation is indicated also by the presence of Mesa Verde Black-on-white ceramics, even in areas where no architectural modification is obvious (Hayes 1975:32). The Mesa Verde occupation is not considered to have been dense or as long as any of the Chacoan Phases, and a terminal date of A.D. 1300 for Anasazi habitation of the area is not unreasonable. Given the elaboration at Chaco and its abandonment, one can

readily understand why almost all Rio Grande artifacts have, in one way or the other, been examined from the Chaco perspective. This is why, for example, Santa Fe Black-on-white (a "Chacoan cognate") figures so importantly as a temporal marker, and why excavators are concerned with whether kivas are oriented north-south (as at Chaco), or east-west (a Rio Grande "characteristic"). In order to approach this general question in a more productive fashion, I consider it advisable to examine San Juan and Rio Grande culture from an ecological perspective: in this respect, the broad view of cultural ecology (Steward 1955), that the adaptations of societies must be seen in the context both of the natural environment and of other societies. As a preliminary to a consideration of ecological problems, I deal with Anasazi subsistence economy.

Anasazi Economy

Most Southwestern archeologists do not doubt that the Anasazi were primarily dependent on horticulture, specifically on corn, beans and squash. These were supplemented by gathered wild foods, particularly plants and to a lesser extent game. Although the notion of agricultural dependence is reasonable when one views the economy and the ceremonial life of modern Pueblo Indians, it must be questioned for their ancestors when three issues are raised. First, the ethnographically known Pueblo Indians have been disrupted and confined to reservations. They have had to cope with massive incursions of "outsiders" (other Indians, Spaniards and Anglos) since about 1500. It has been about 400 years since options they once might have pursued have been closed to them by other groups of people, as well as by domestic livestock. Second, as discussed in the assessment of the Archaic, horticulture requires more labor investment than does hunting and gathering and, therefore, might not be a preferred strategy. Third, although people may be "willing" to invest more labor in cultivation without population pressure, the requirements of the crops themselves must be considered. These requirements are both edaphic (soil conditions and nutrients) and climatic (available moisture, length of the growing season). Corn, which is considered the dietary staple, requires about 120 days to mature.

Further, maturation rates depend on the amount of available moisture; in years of drought it matures very slowly, if at all. Any consideration of Anasazi economy must consider both the requirements of their basic crops as well as the material artifacts recovered archeologically. With this in mind, some considerations of present and past conditions in the study area as these pertain to horticulture, are examined. Maps 2 through 6 and Figures 2 through 4 a-r provide more detail than is addressed in the text and should be examined.

Unfortunately, very little research on the edaphic requirements of prehistoric varieties of maize has been done, except to note that salinization is a problem in many areas of the Southwest because of inadequate drainage and high rates of evaporation (Fosberg and Husler 1977; Castetter and Bell 1942). For this reason, climatic considerations are given more attention. As remarked above, corn requires about 120 days to mature. For example, Hack (1942:20) has commented that the 130 day growing season at the Hopi villages on First Mesa is considered short because of the lack of moisture. Thus, the length of the growing season and the availability of moisture must be considered relevant variables.

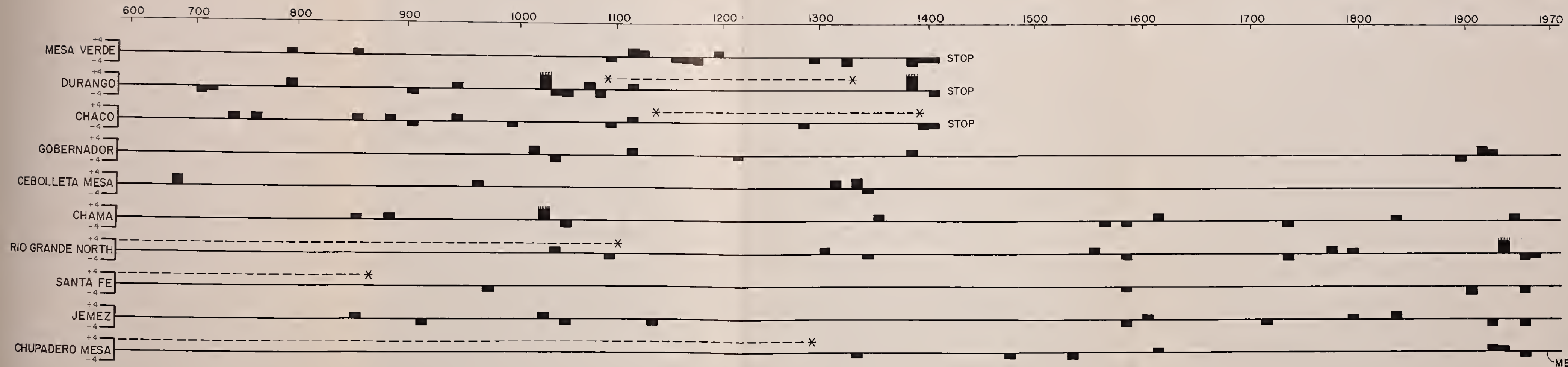
Four approaches have been used widely in examining past climatic conditions. First, modern climate may be taken as a general guide to the past, because much of the variability in rainfall and growing season in the Southwest is the result of latitude and topography (including elevation and exposure), and these have not changed during the period under consideration. Second, dendroclimatological (tree-ring) reconstructions are useful and becoming more refined. Third, geological studies of sequences of arroyo cutting and alluviation are general indices of precipitation trends. Finally, palynological reconstructions (studies based on fossil pollen) are useful in the analysis of past vegetation and therefore, the climatic conditions which supported the plant communities represented. Although none of these methods produce completely unambiguous results, when used in combination they are considered to be quite accurate.

Today, as in the past, temperature range is determined primarily (not exclusively) by latitude and altitude. In New Mexico,

temperature decreases northward from 1.5° F to 2.5° F for every degree of latitude. Temperatures also generally correlate inversely with elevation, but this is conditioned by several factors related to regional topography. The direction of exposure is important for the amount of insolation received and therefore temperature. The contrast is marked especially in deep, narrow valleys and canyons with east-west orientations. For example, temperature differences at the same elevation on the south wall and the north wall of Frijoles Canyon showed a 13° difference in mid-afternoon. The Frijoles Canyon cave dwellings, restricted to the north wall, would have been warmer in winter than other parts of the canyon (Houghton 1959:68). Temperature differences are also noted between the east and west flanks of north-south oriented mountains, such as the Sangre de Cristos, the Sandias and the Jemez. The maximum temperature is higher on the west flank than on the east even when the amount of radiation received is the same. Another well known factor is air drainage and wind shifts that cause temperature changes in narrow valleys and steep canyons. Particularly on clear, still evenings, cool heavy air drains into canyon bottoms so that temperatures at these locations may be several degrees below those on the sides of canyons. Shifts in wind direction, which are common in canyons, also cause temperature changes. Houghton (1959:70) stated that a sudden shift in wind direction one night in October of 1917 caused a temperature drop of 27° F in one hour in a canyon setting.

Some general observations with respect to temperature are particularly important to plant germination and growing season length. In New Mexico, daily temperature changes are greatest in spring which may endanger germinating seeds. In April, the daily average range may be as much as 39° F; a secondary peak occurs in the early autumn (Houghton 1959:70, 71). Variability in the length of the growing season and frost-free period is characteristic. For example, at Chama the mean growing season over a ten year period was 109 days but varied as much as 15 days from one year to another. Taos had a mean growing season of 138 days over a ten year period, but variations of more than 30 days occurred from one year to another (Tuan 1969; Houghton 1959). (See Map 5 (in map pocket) and Figures 3 a-j.)

DEVIATIONS FROM MEAN TREE-RING WIDTH FROM SELECTED STATIONS



LEGEND

— * INTERPOLATED

+4, -4 STANDARD DEVIATIONS

THICK BAR TWO OR MORE STANDARD DEVIATIONS FROM THE MEAN

Figure 2.

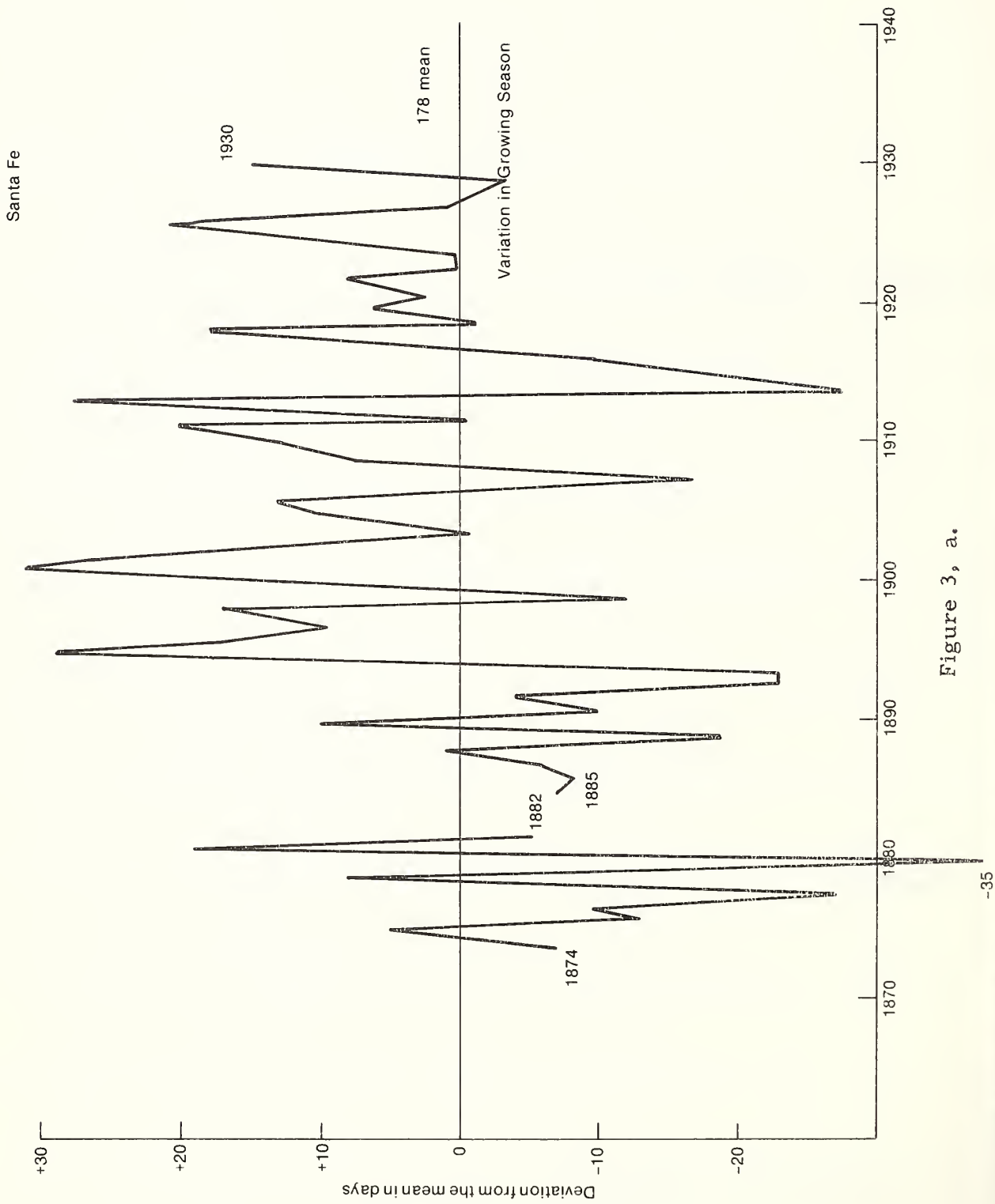


Figure 3, a.

Taos

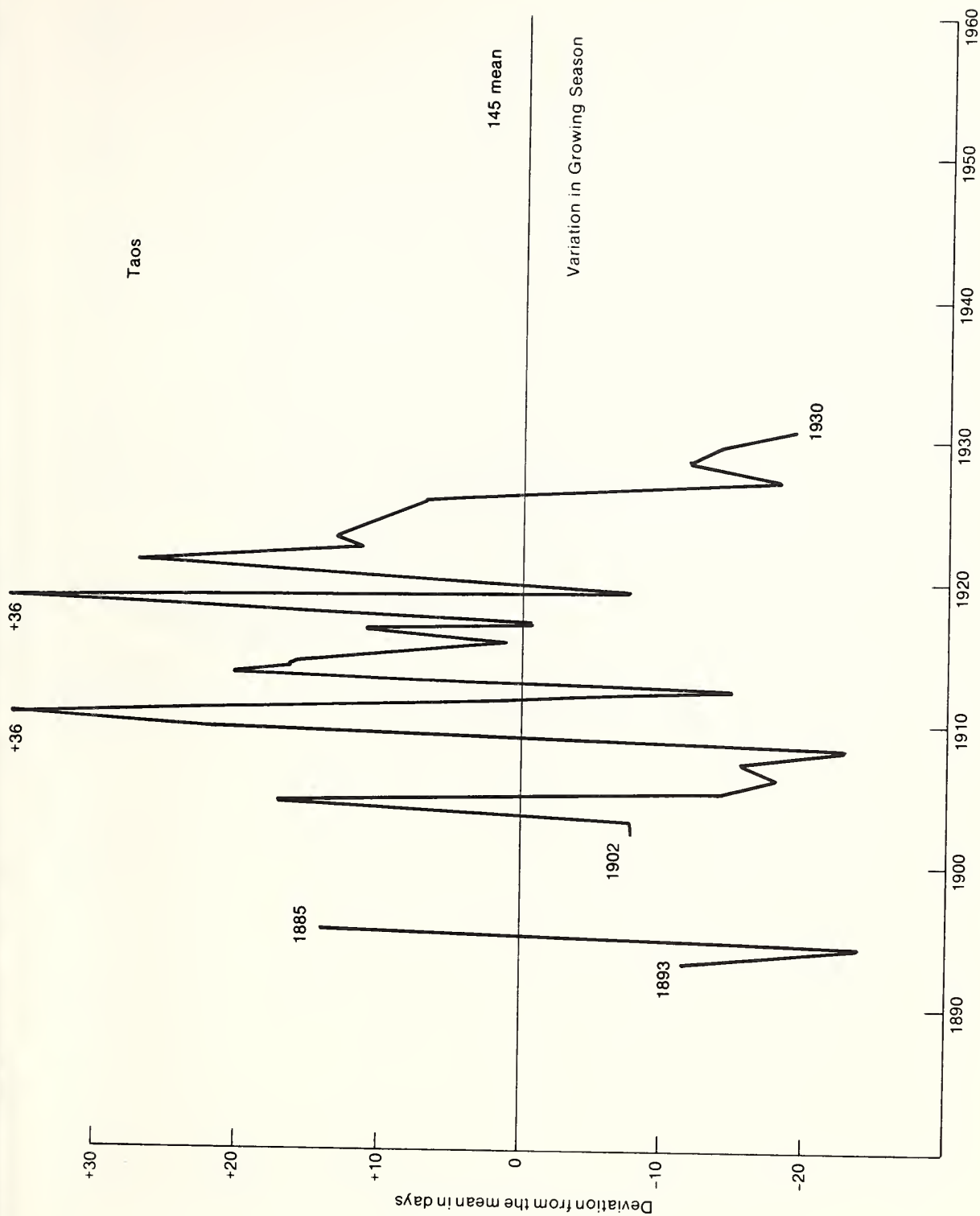


Figure 3, b.

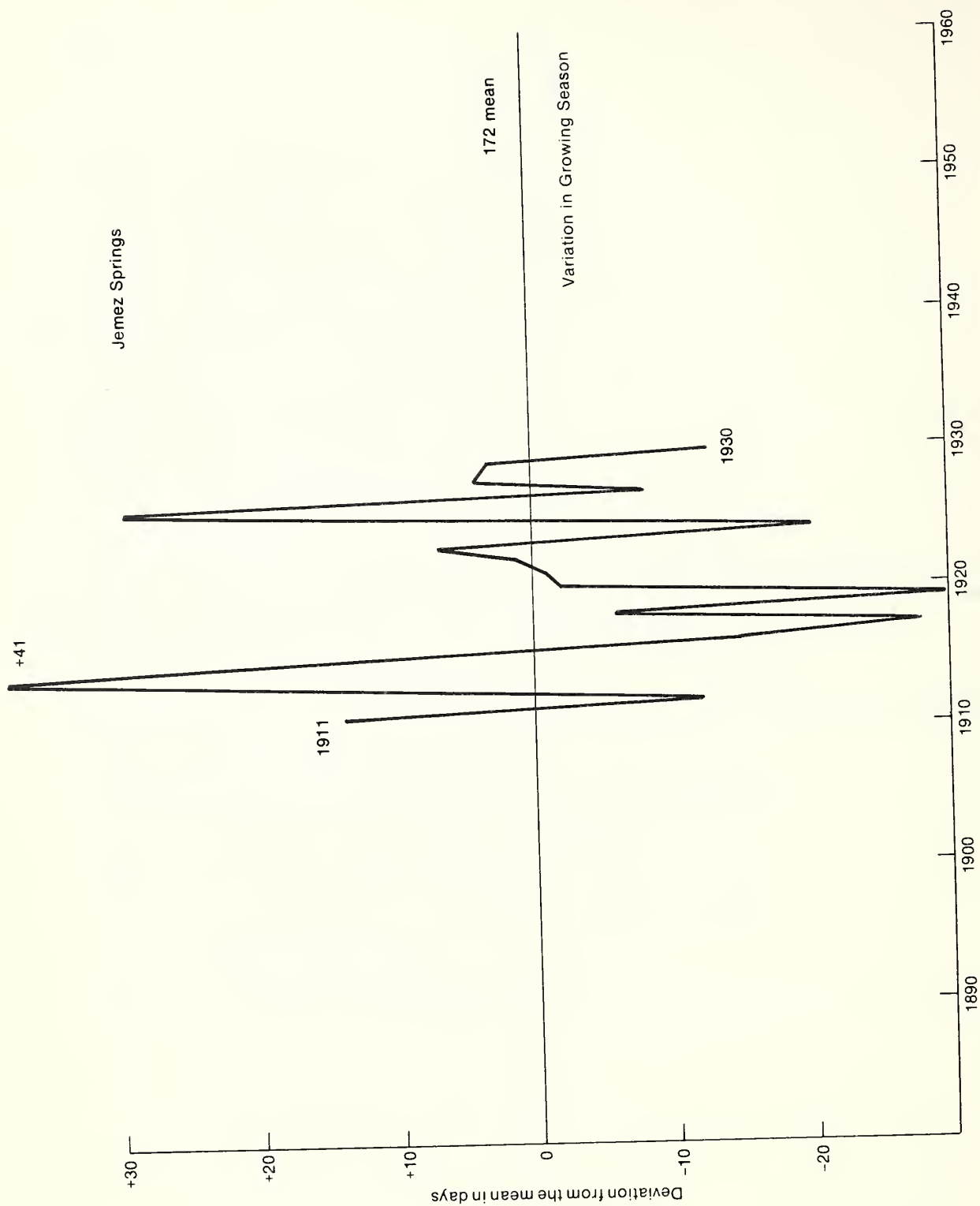


Figure 3, c.

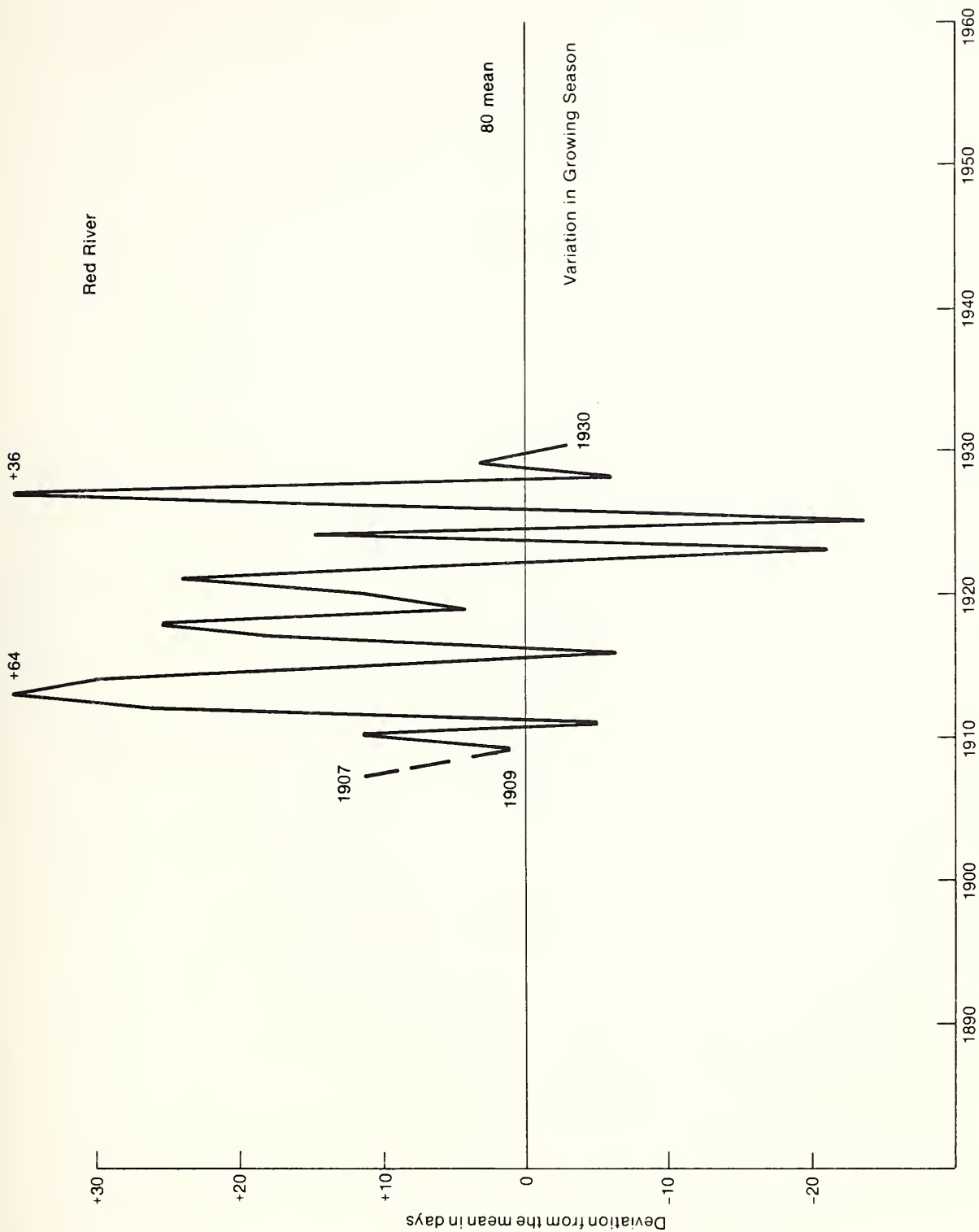


Figure 3, d.

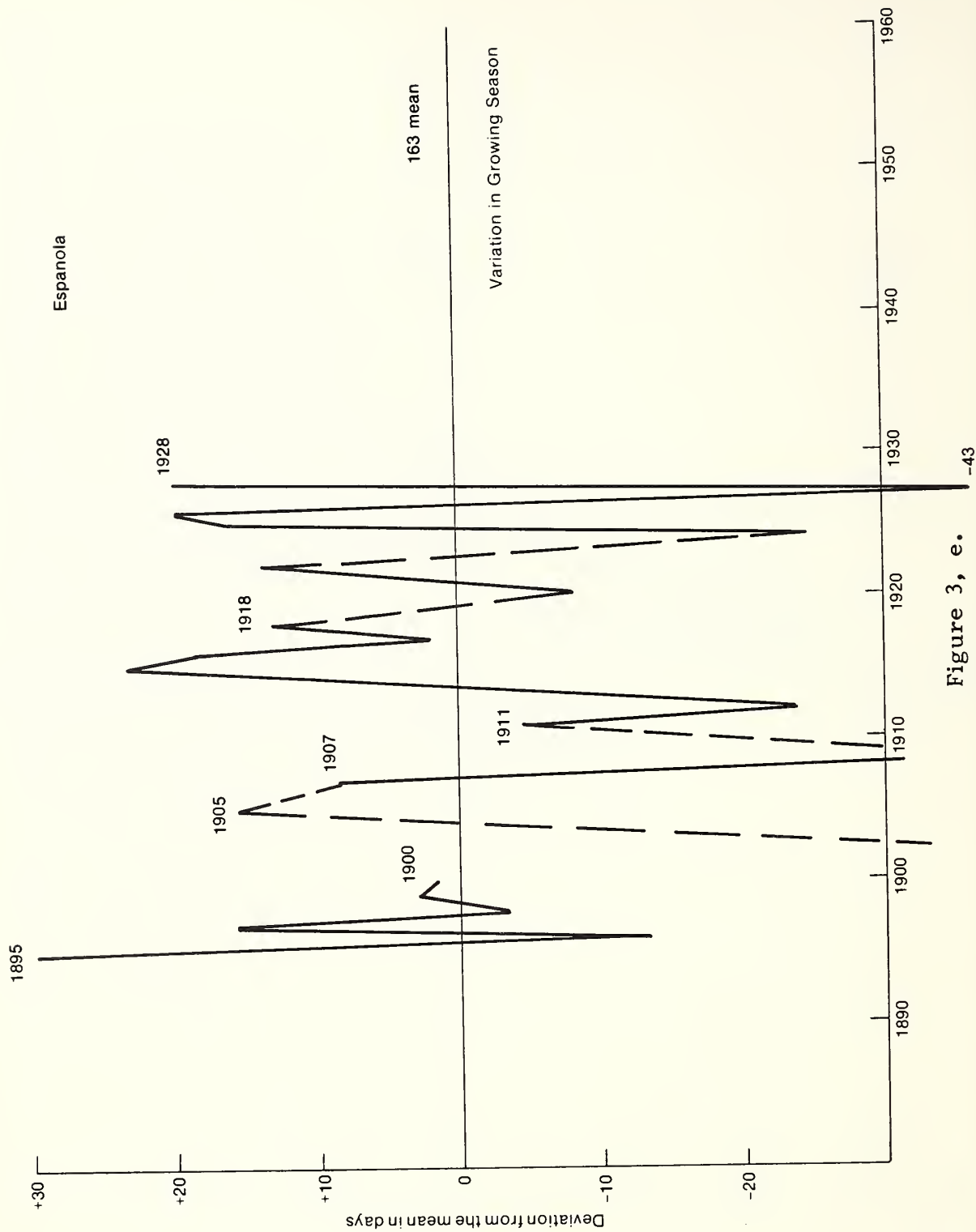


Figure 3, e.

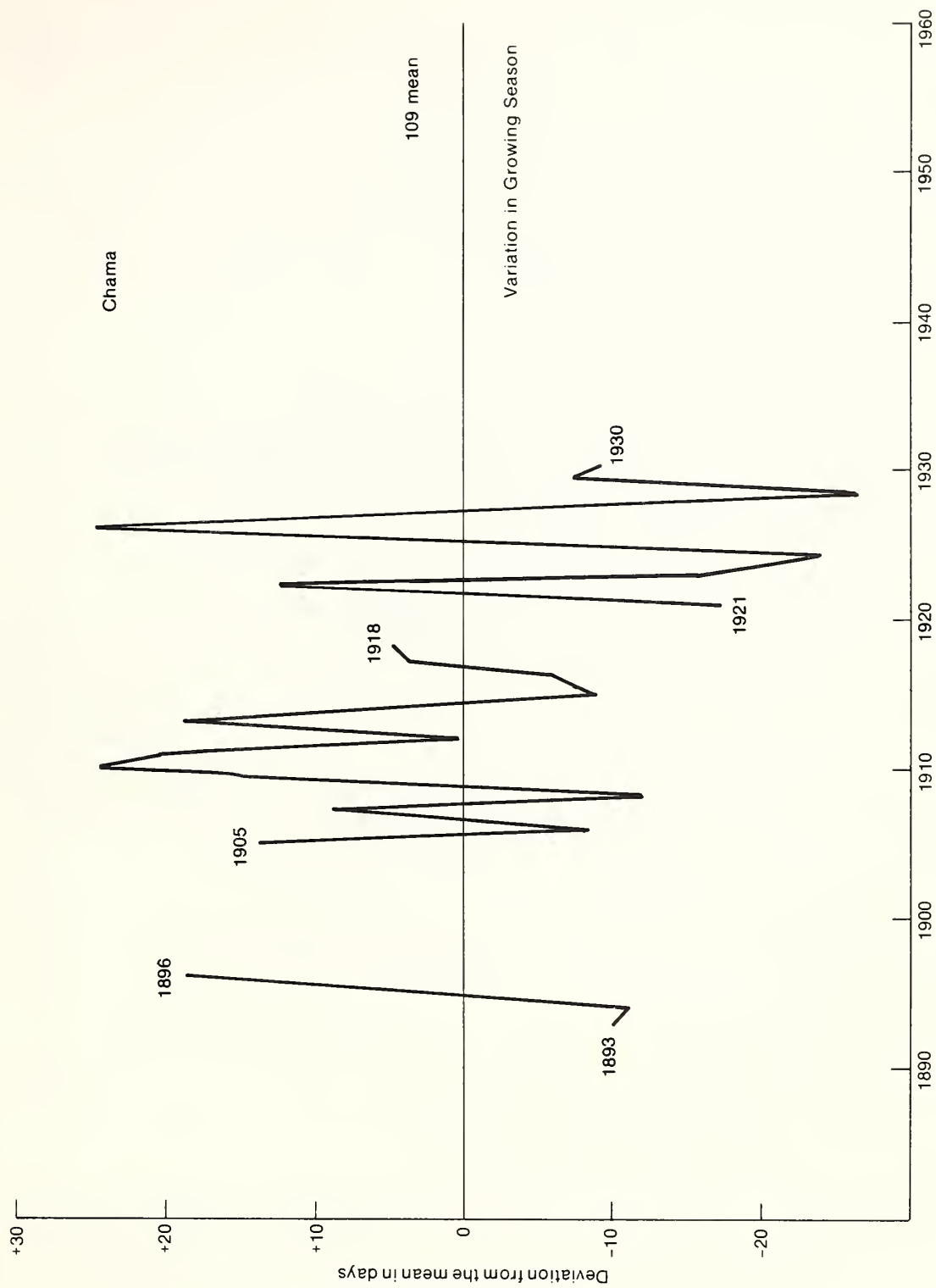


Figure 3, f.

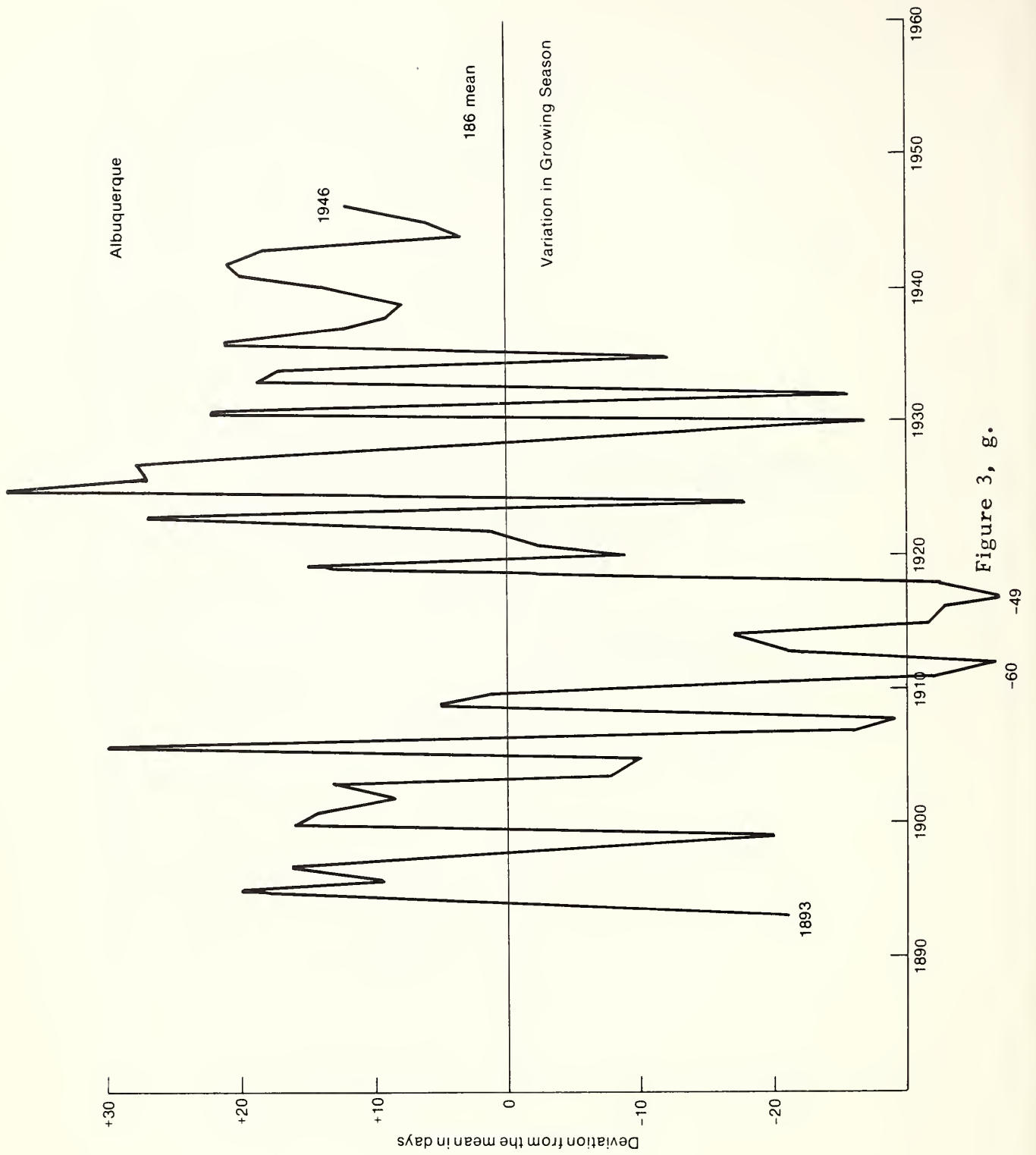


Figure 3, g.

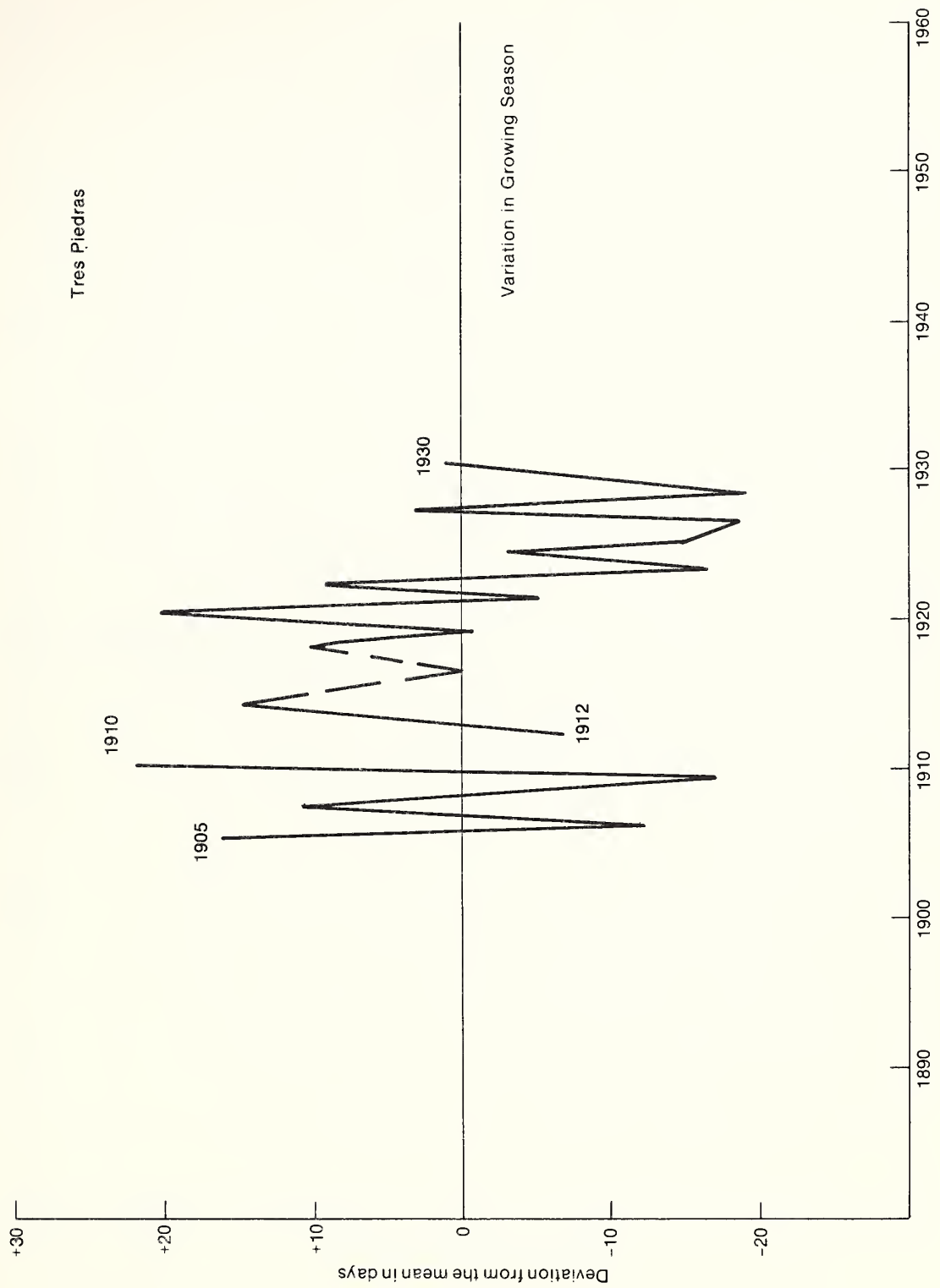


Figure 3, h.

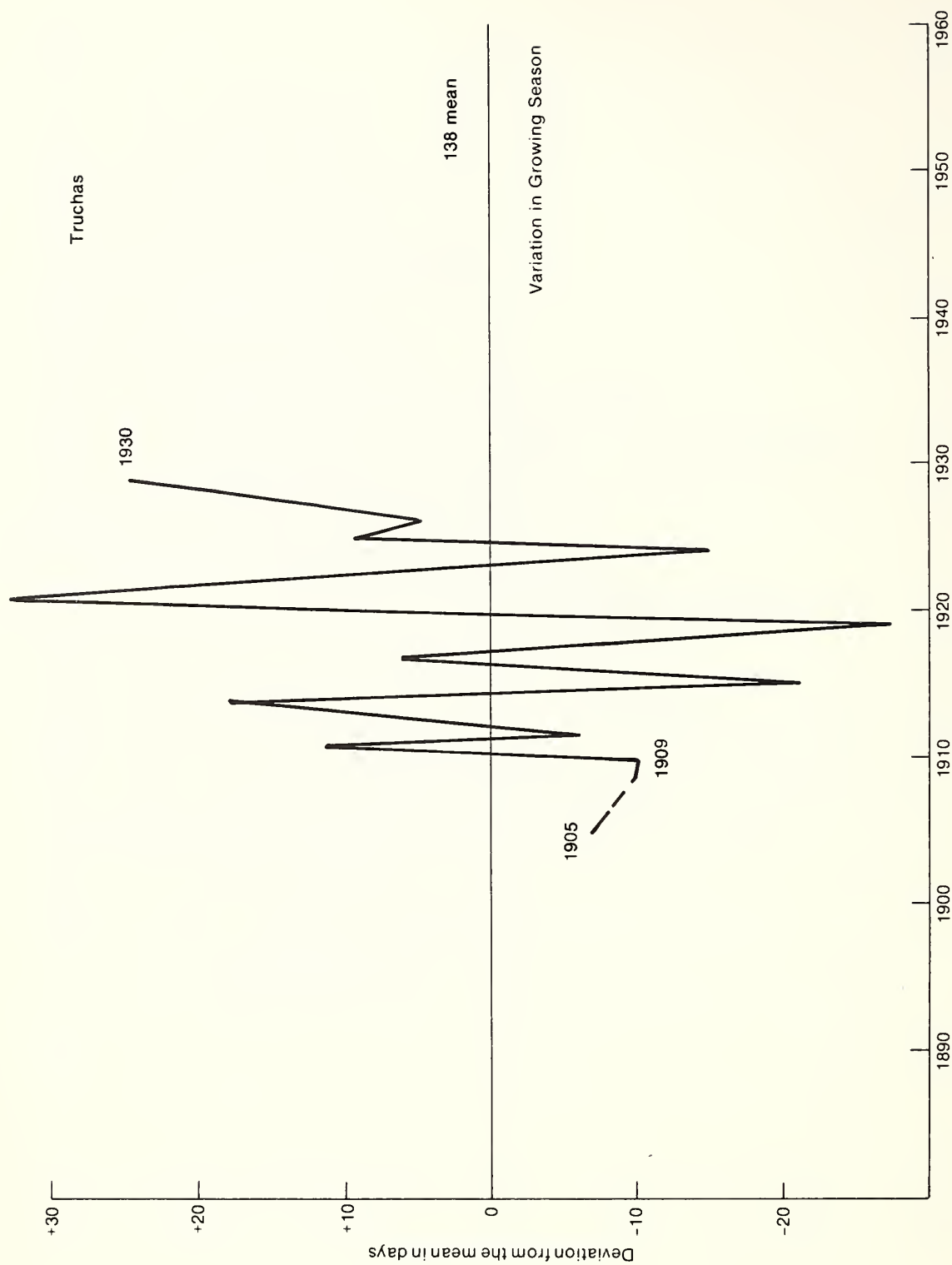


Figure 3, i.

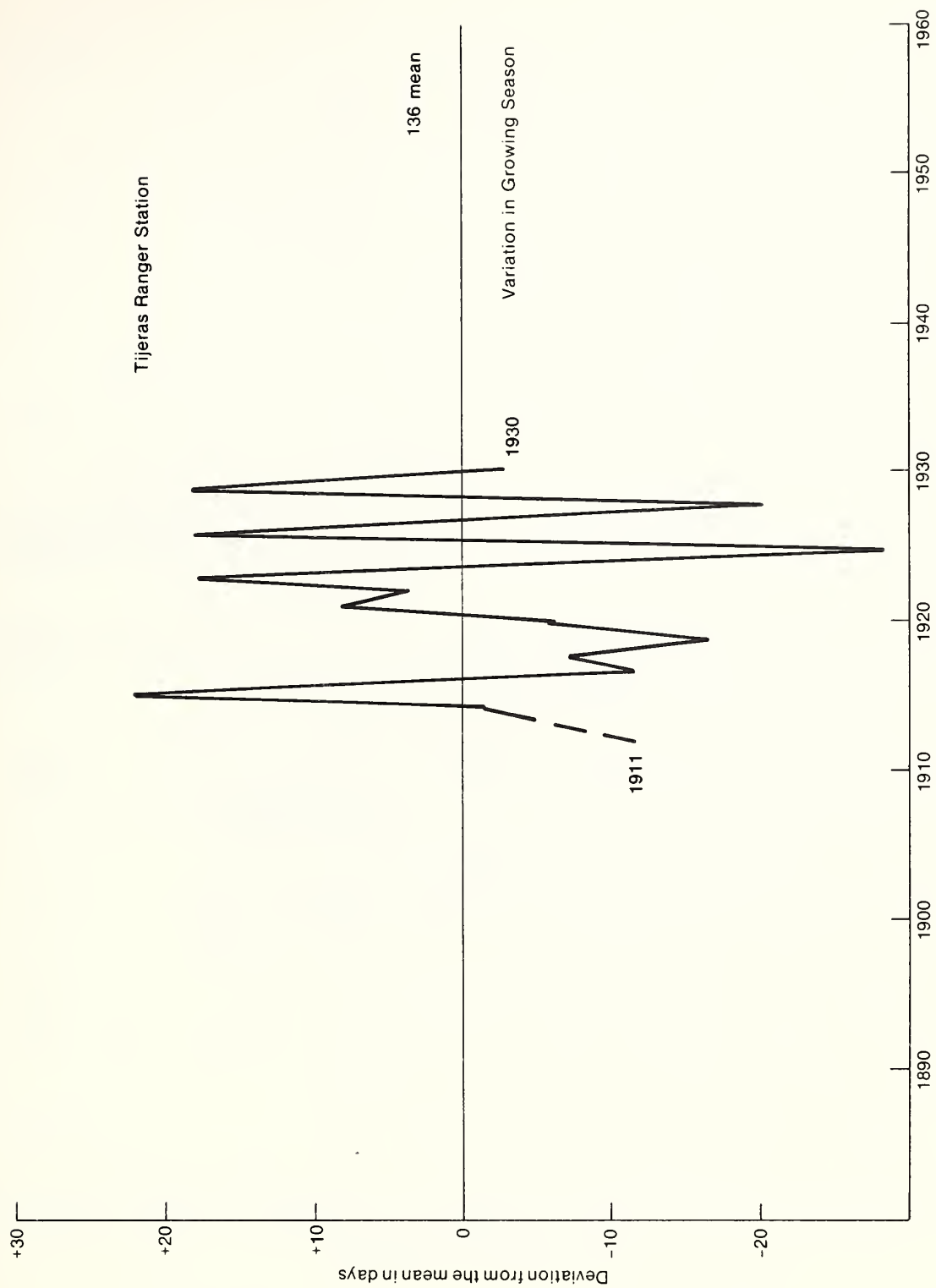


Figure 3, j.

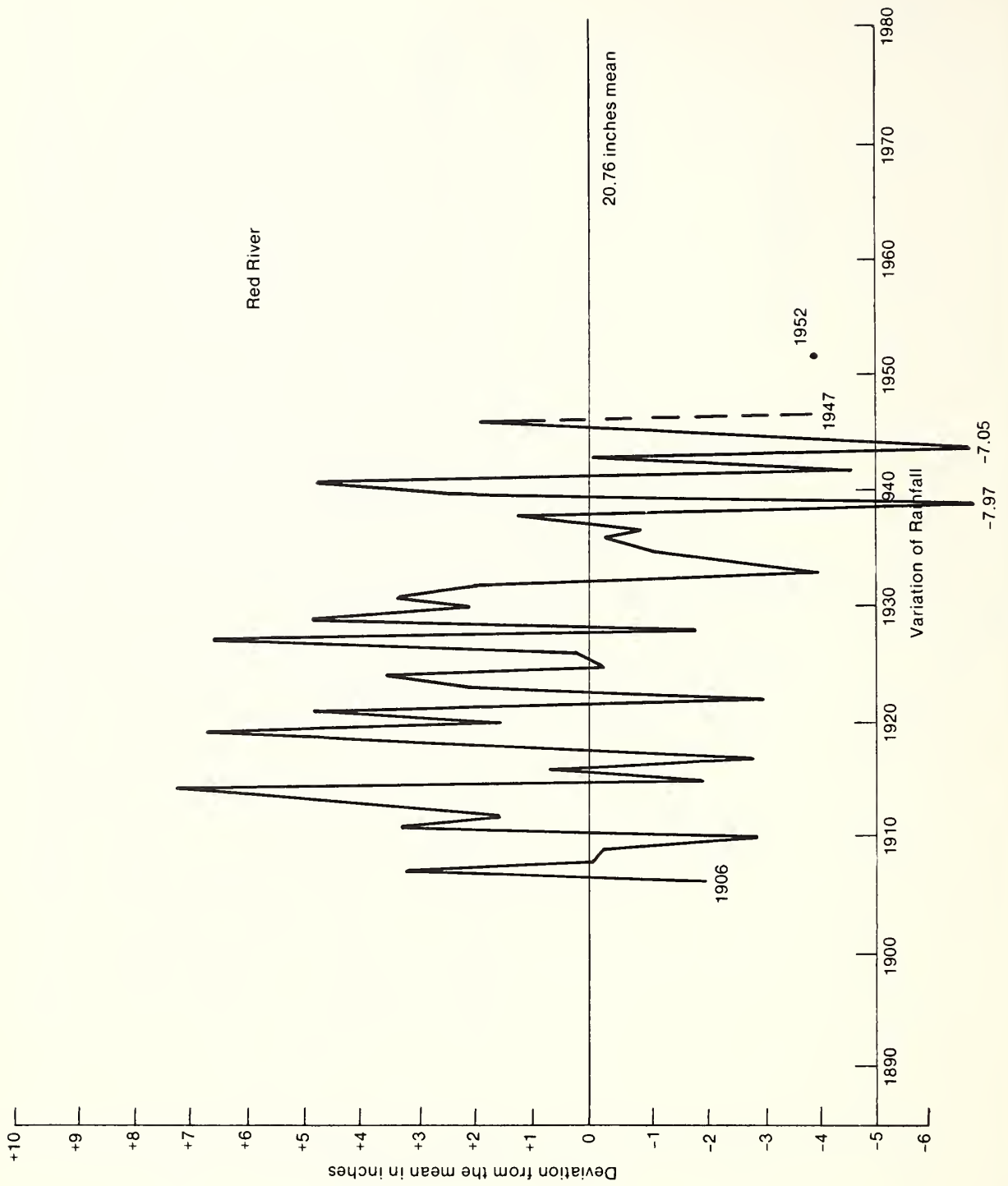


Figure 4, a.

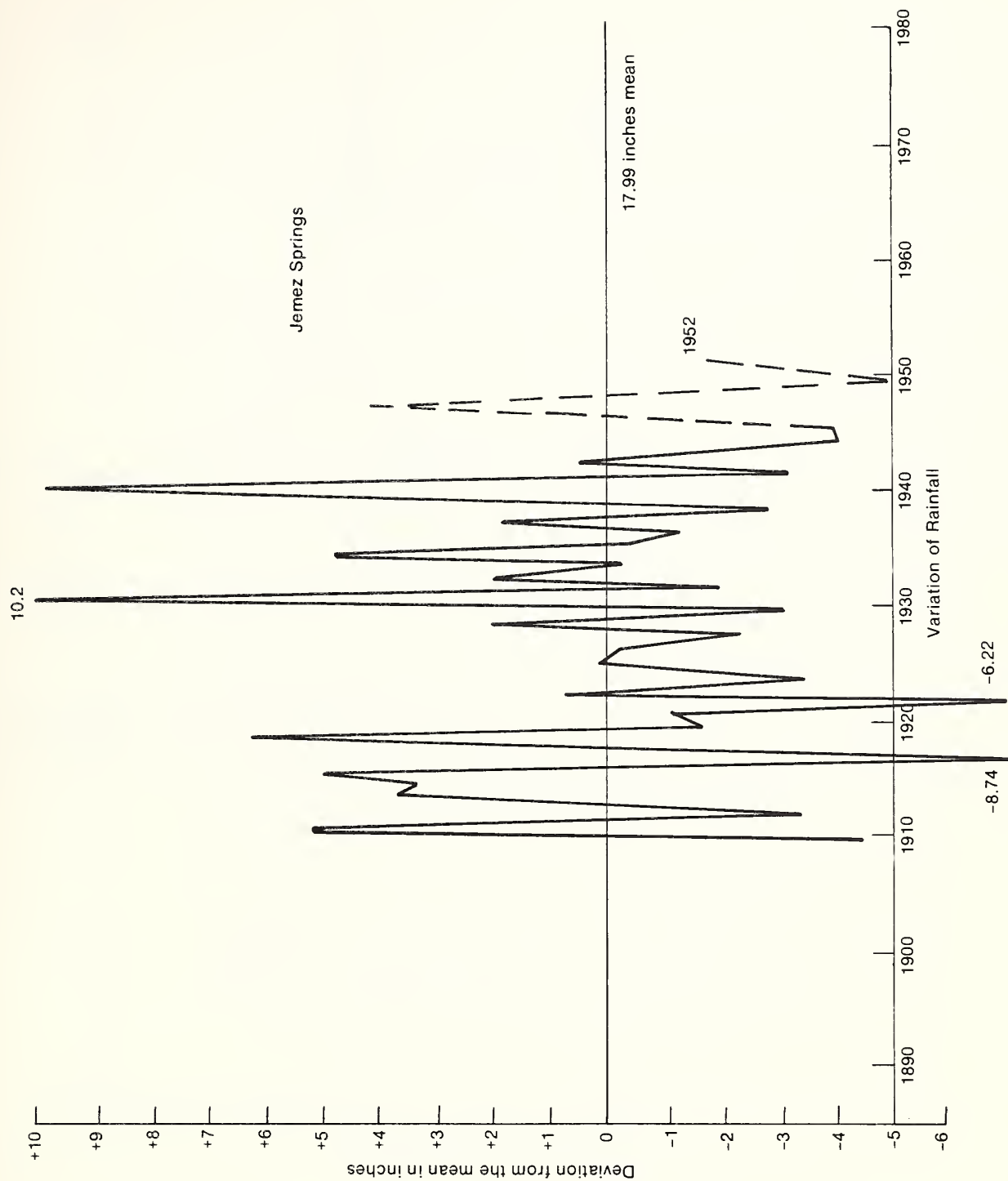


Figure 4, b.

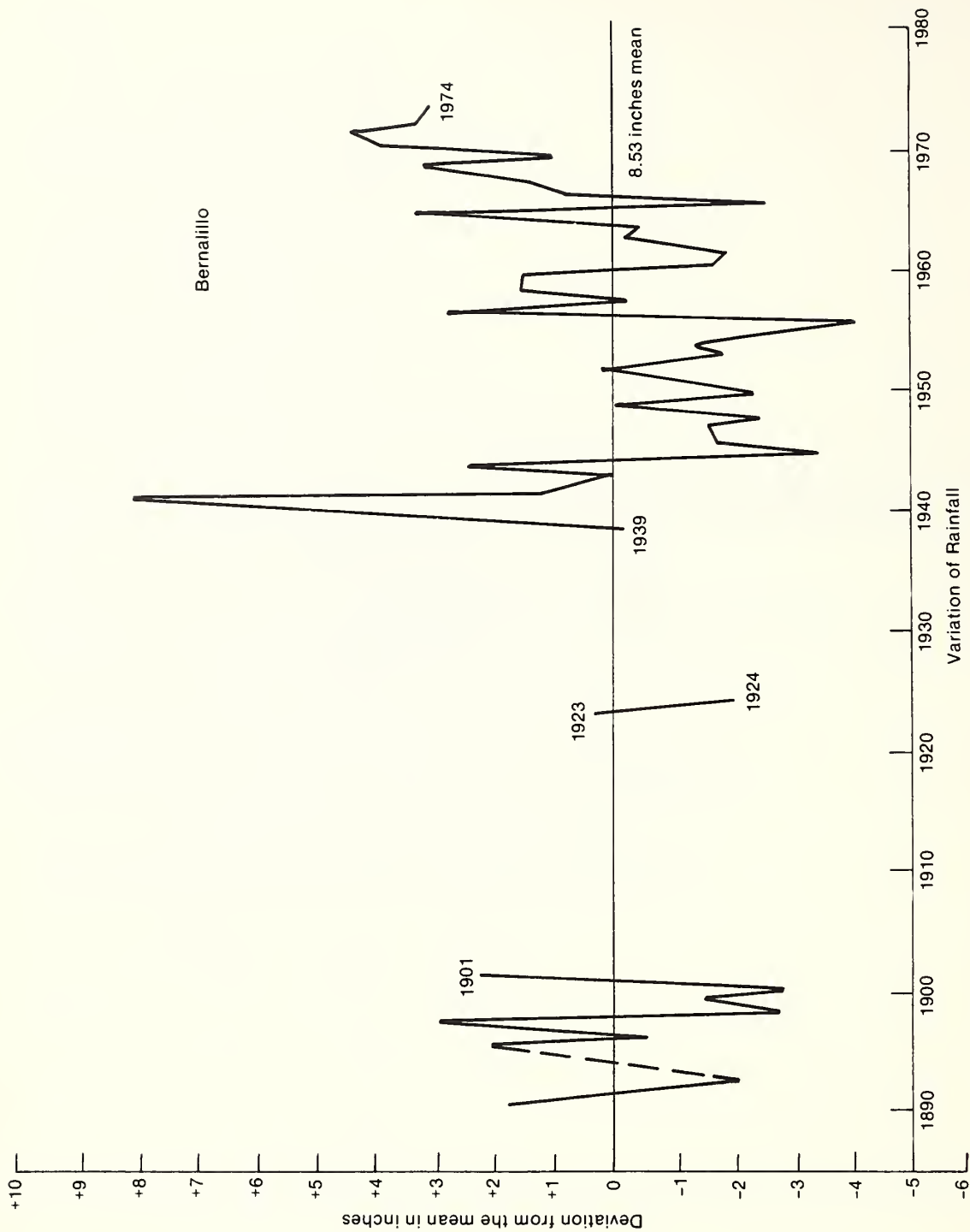


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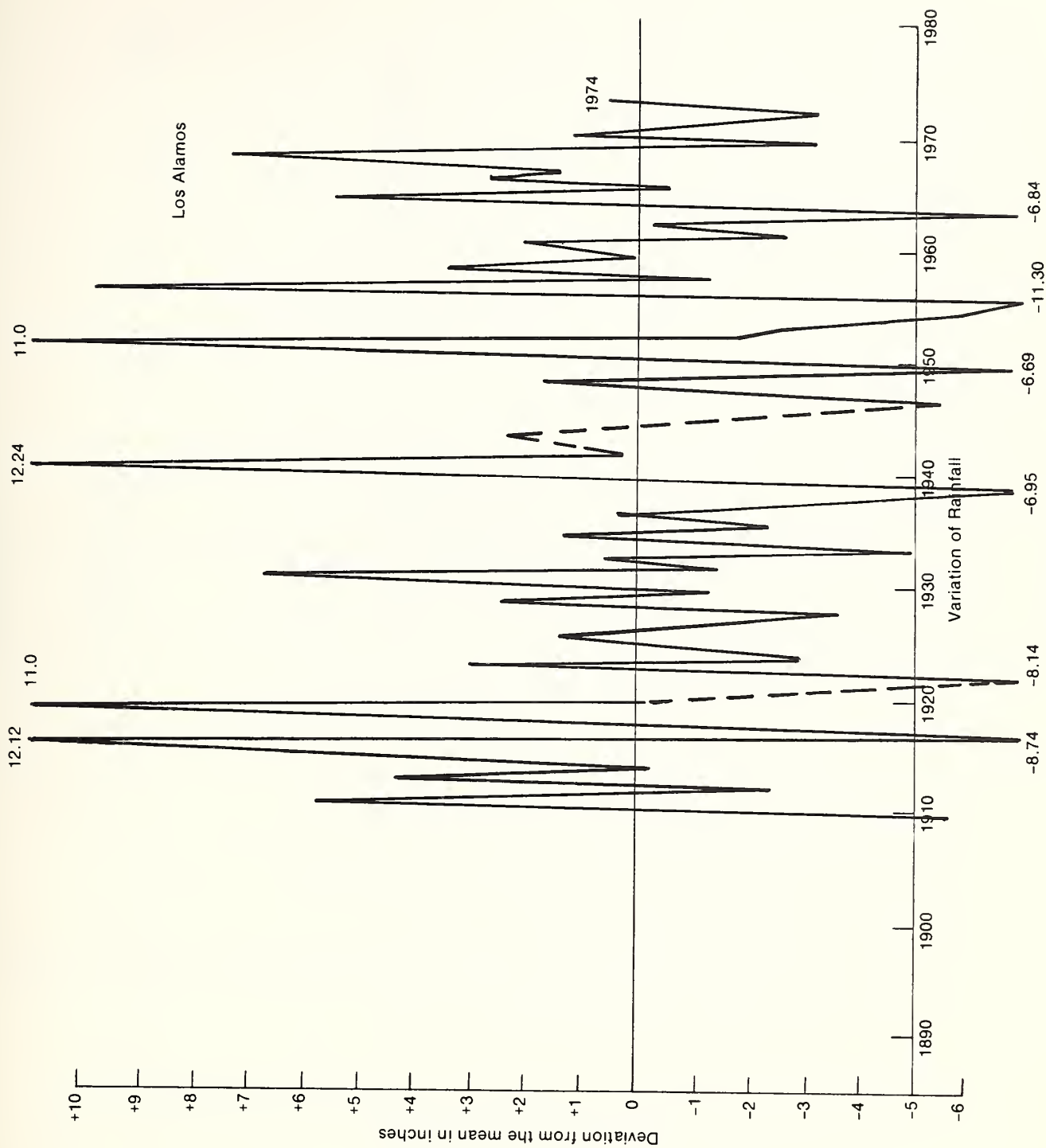


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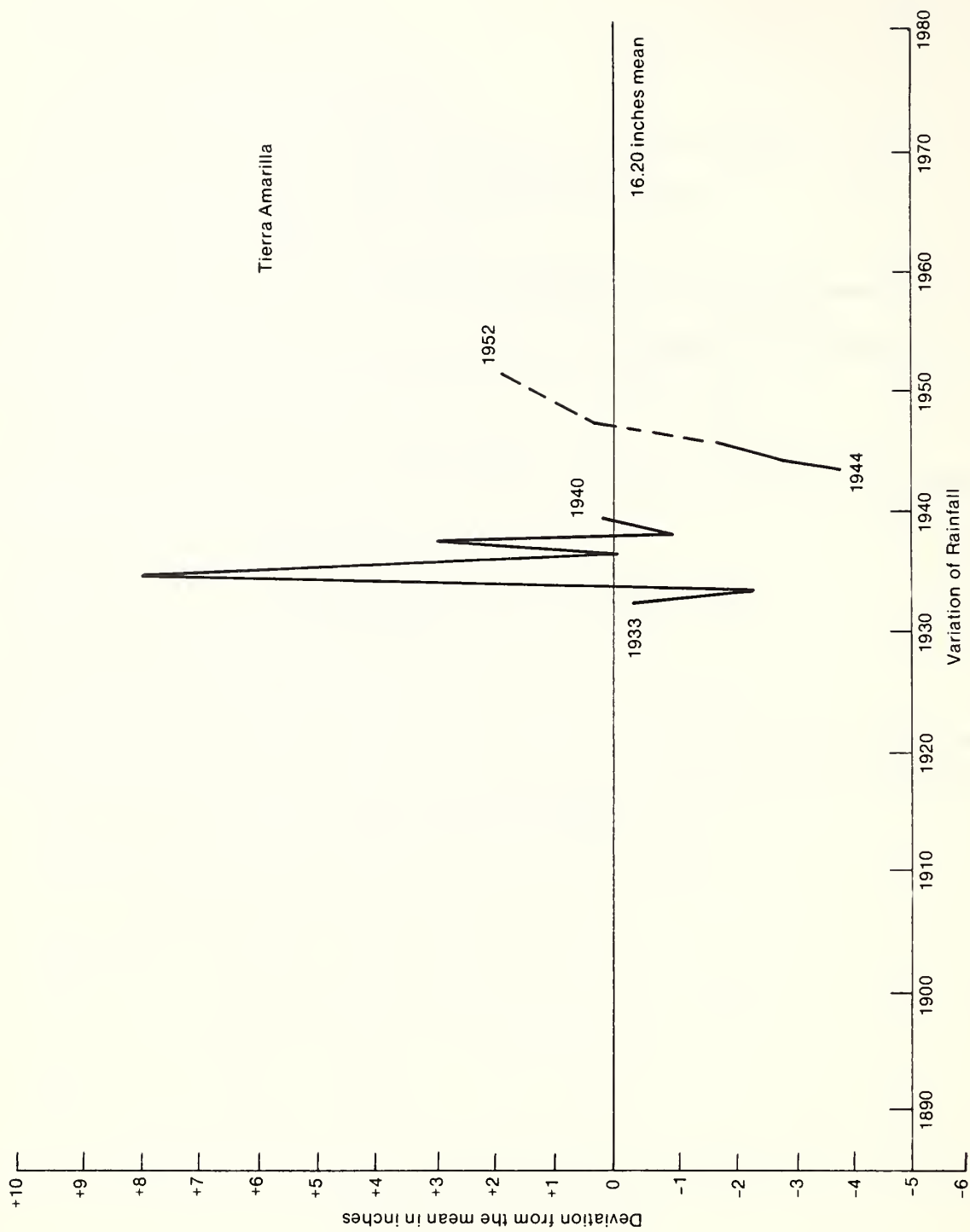


Figure 4, e.

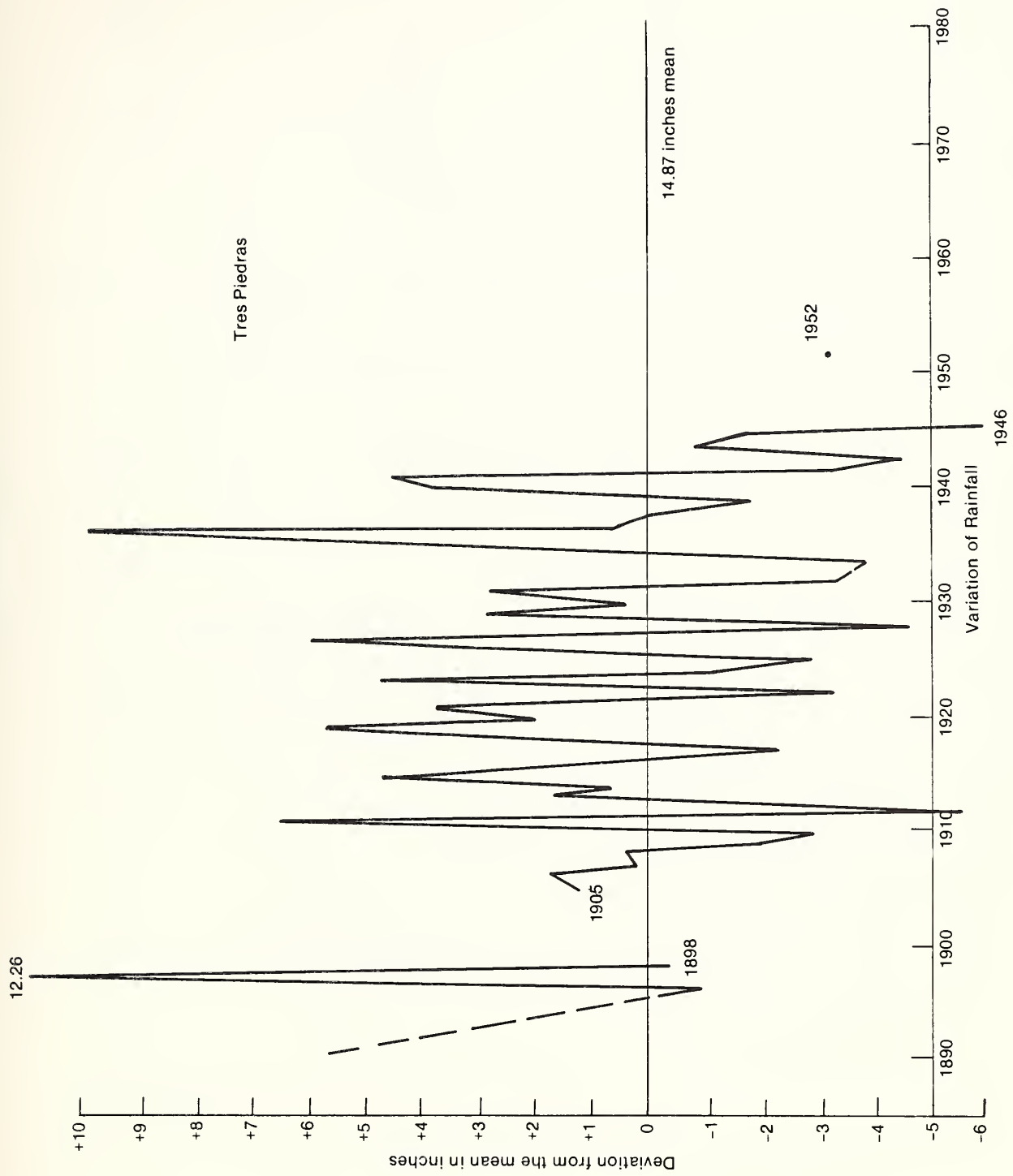


Figure 4, f.

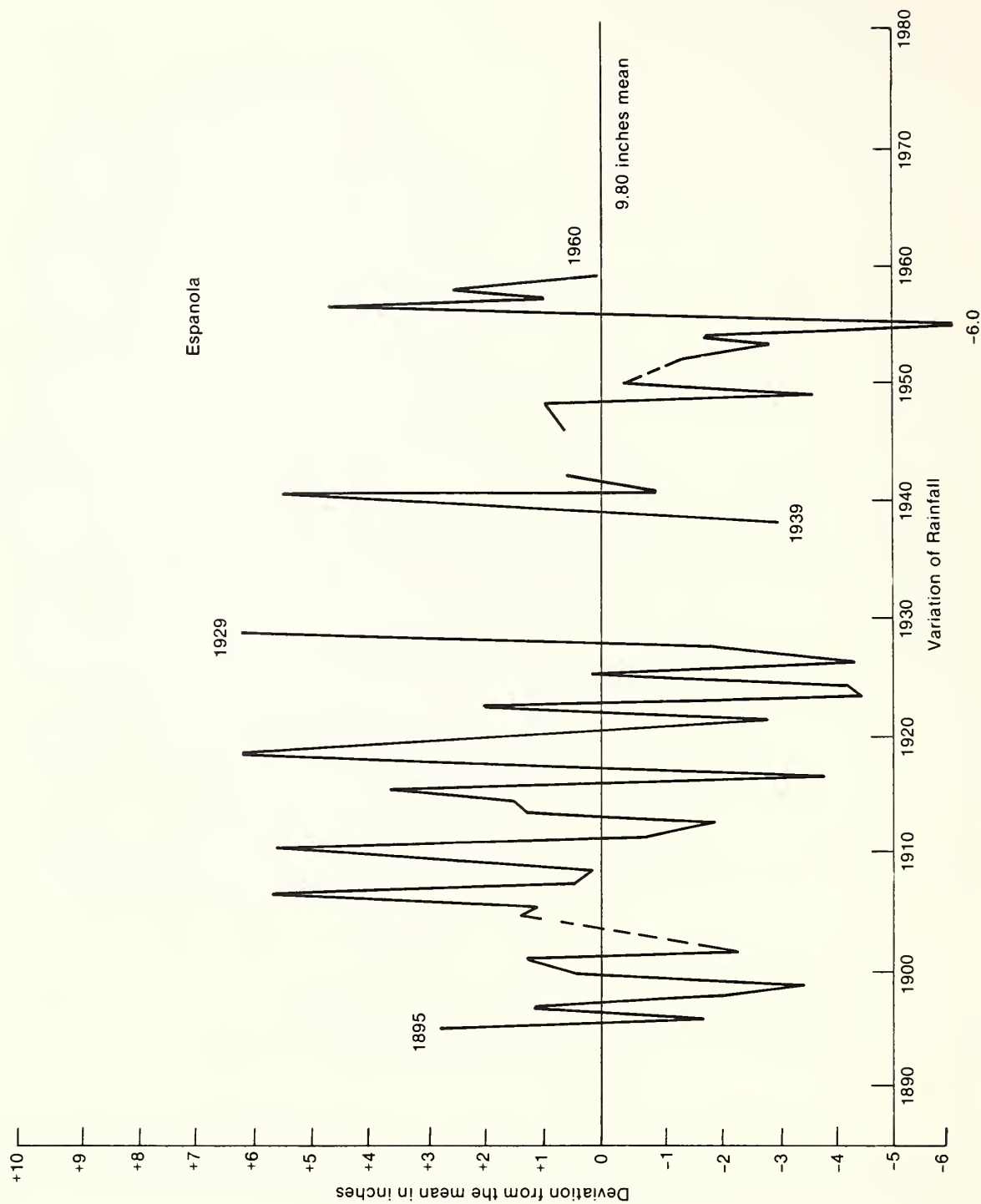


Figure 4, g.

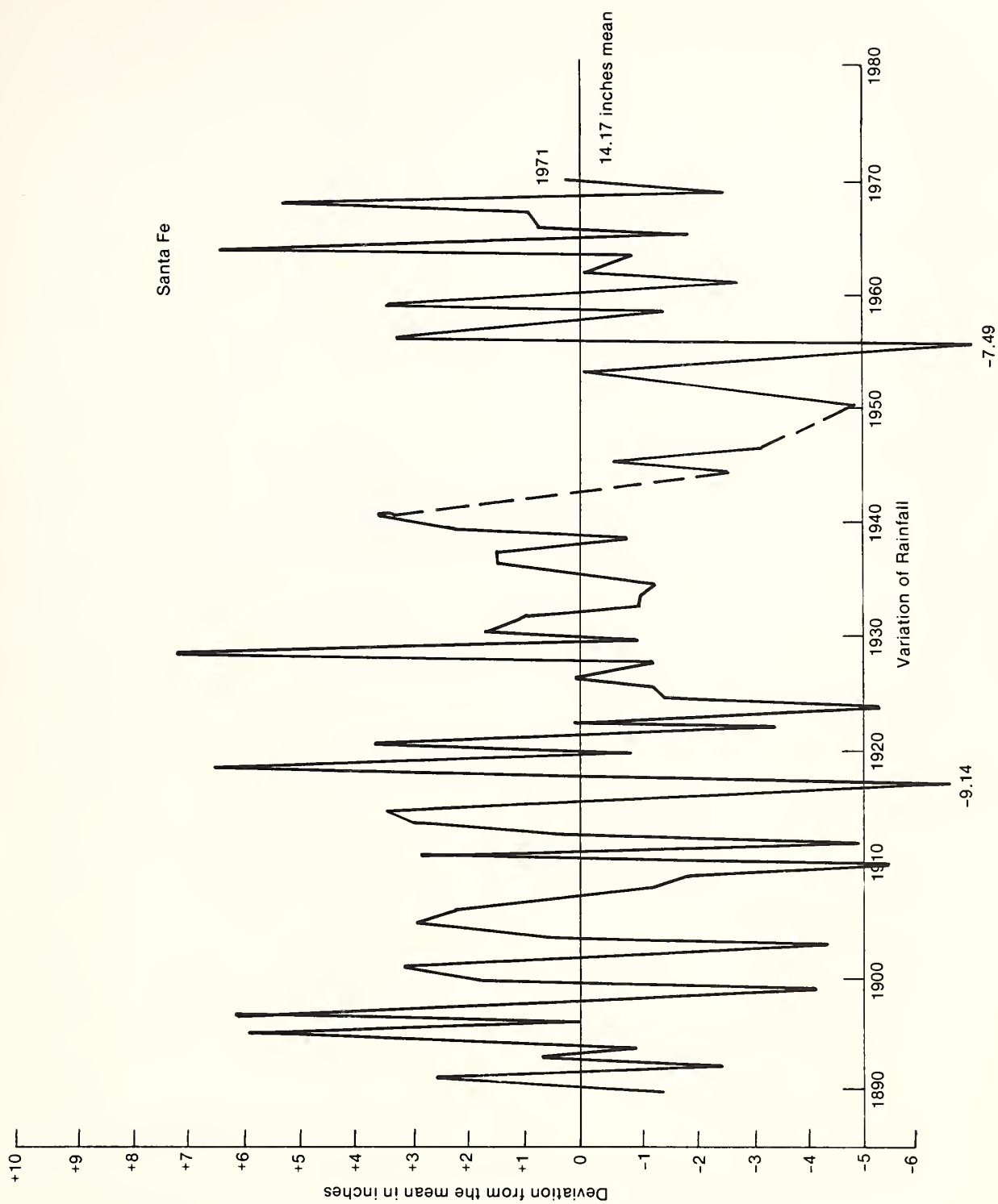


Figure 4, h.

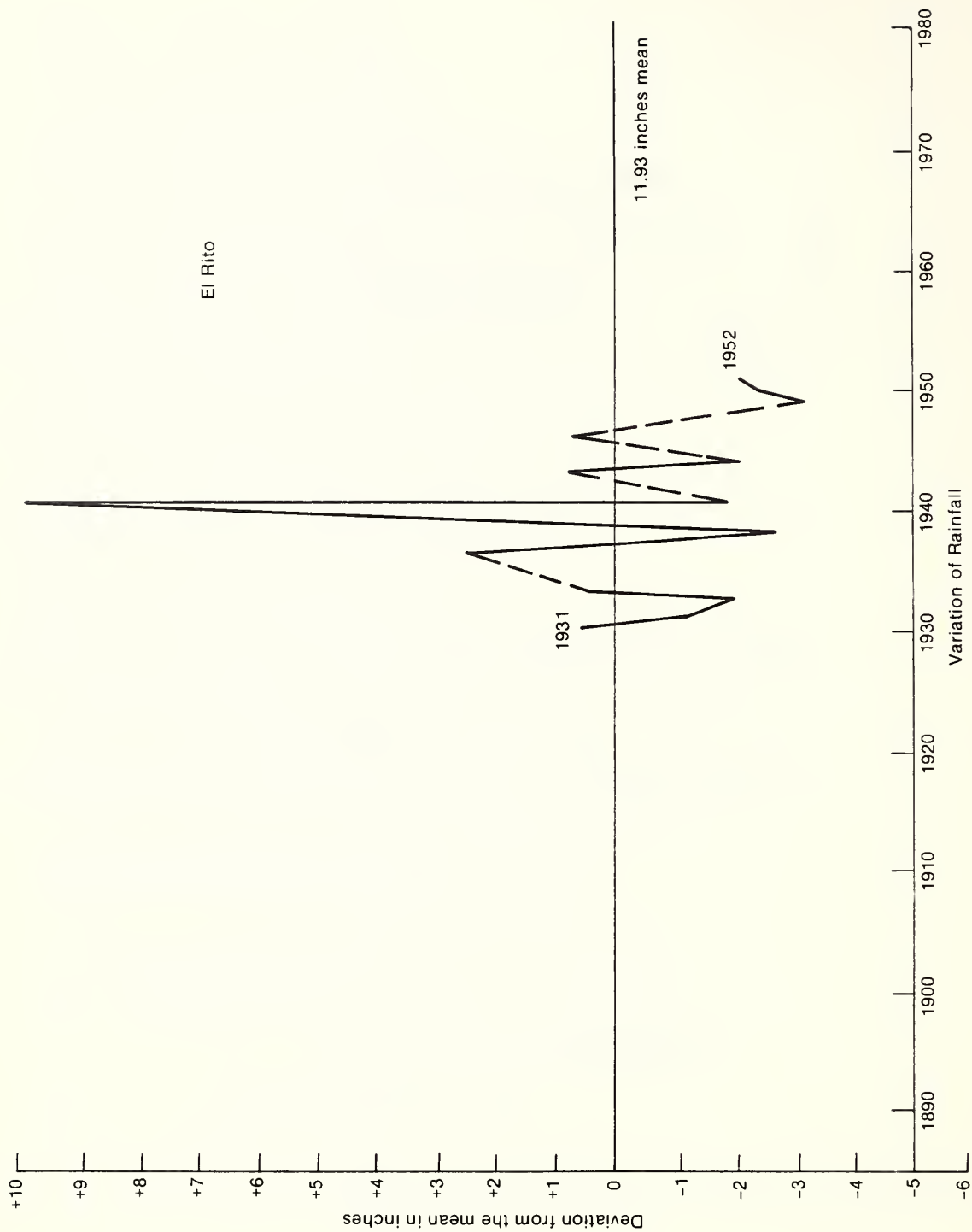


Figure 4, i.

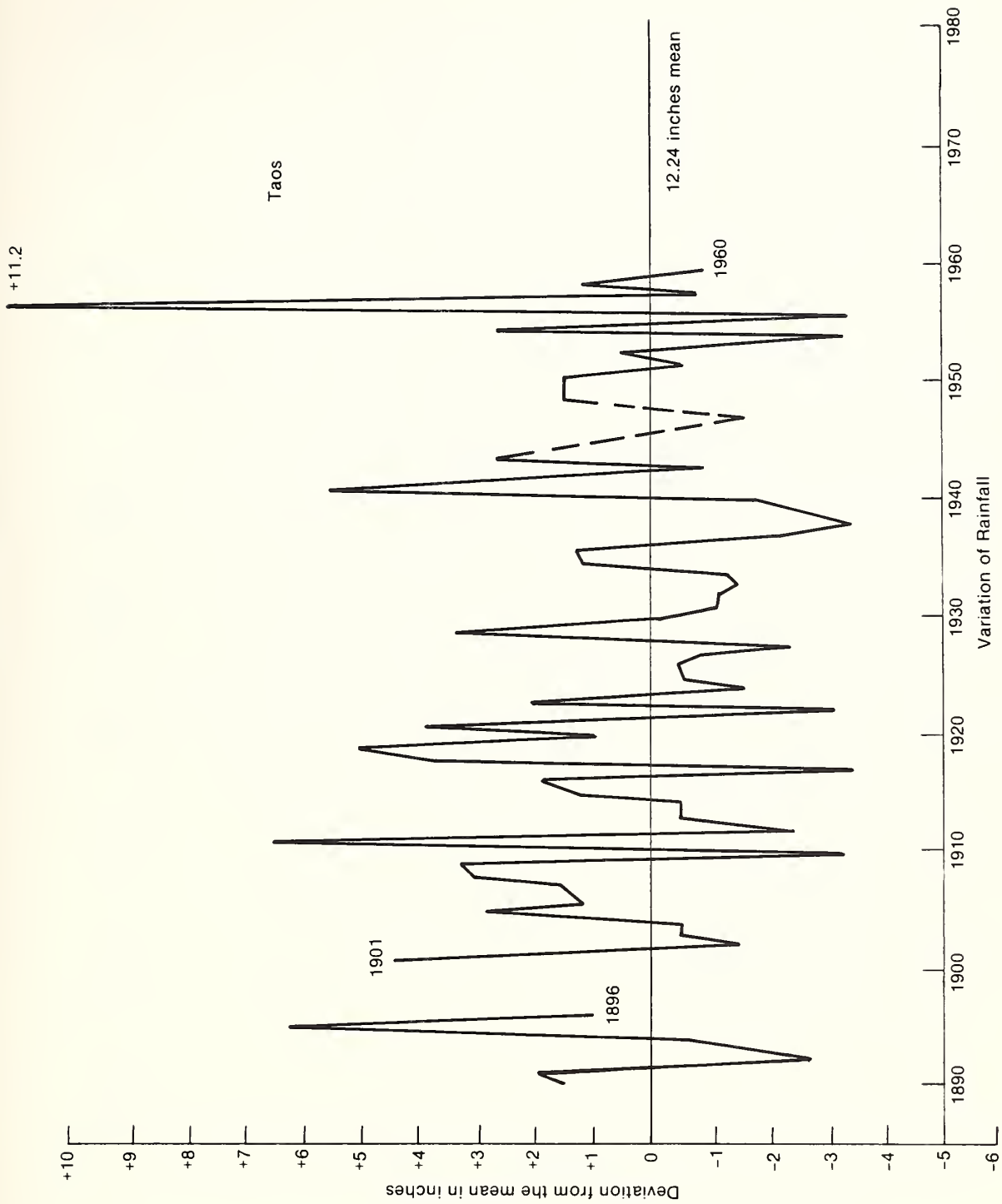


Figure 4, j.

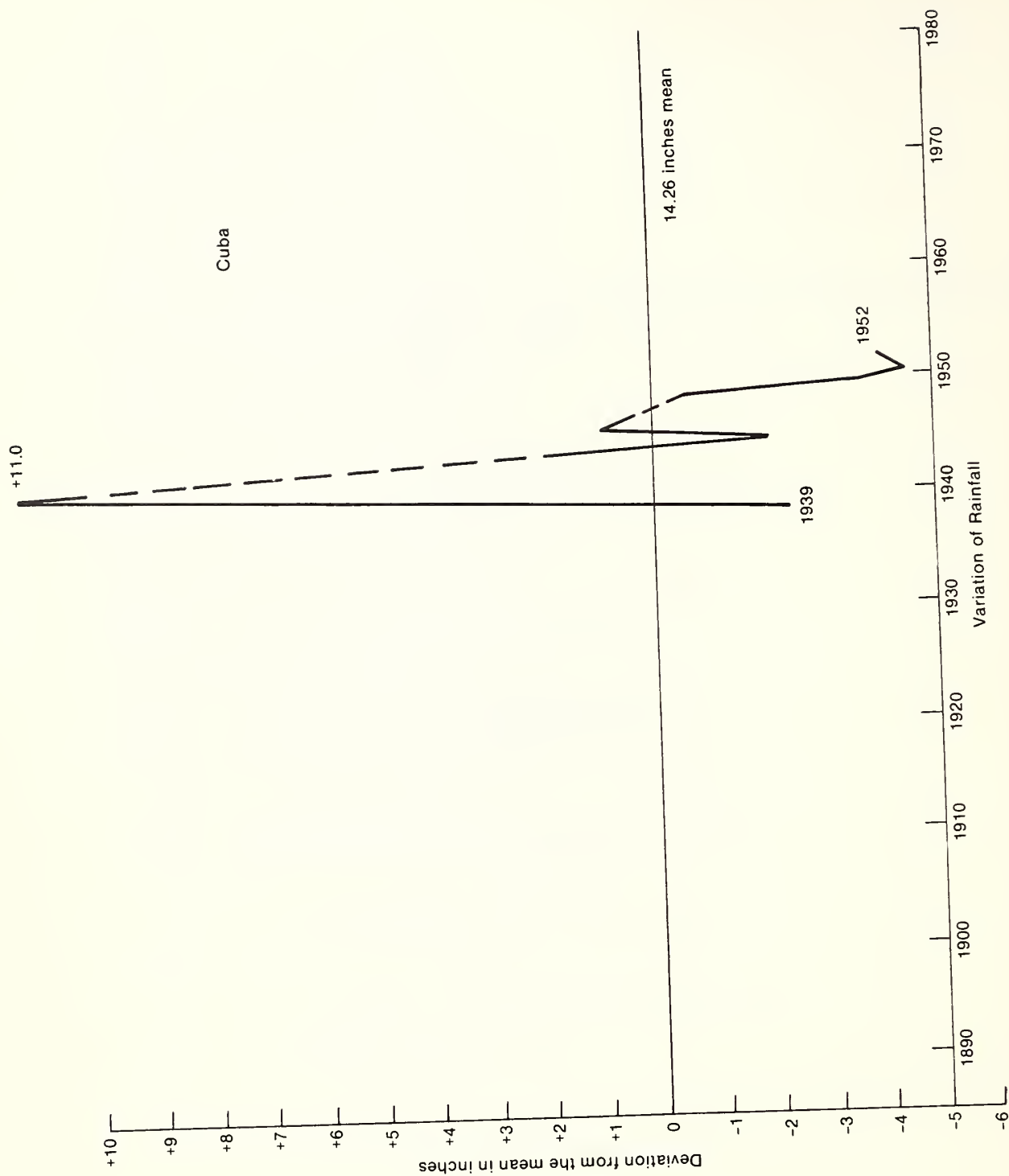


Figure 4, k.

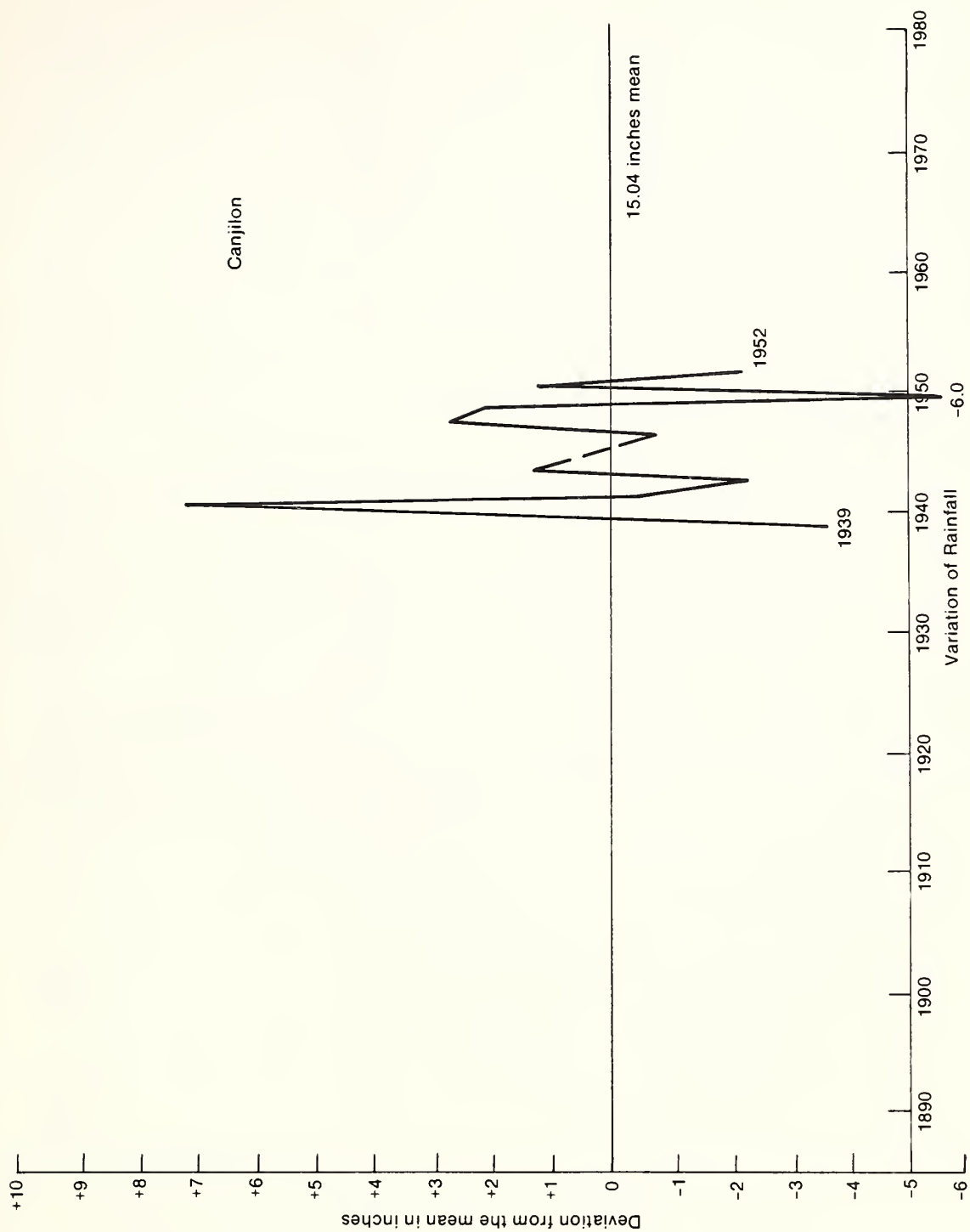


Figure 4, 1.

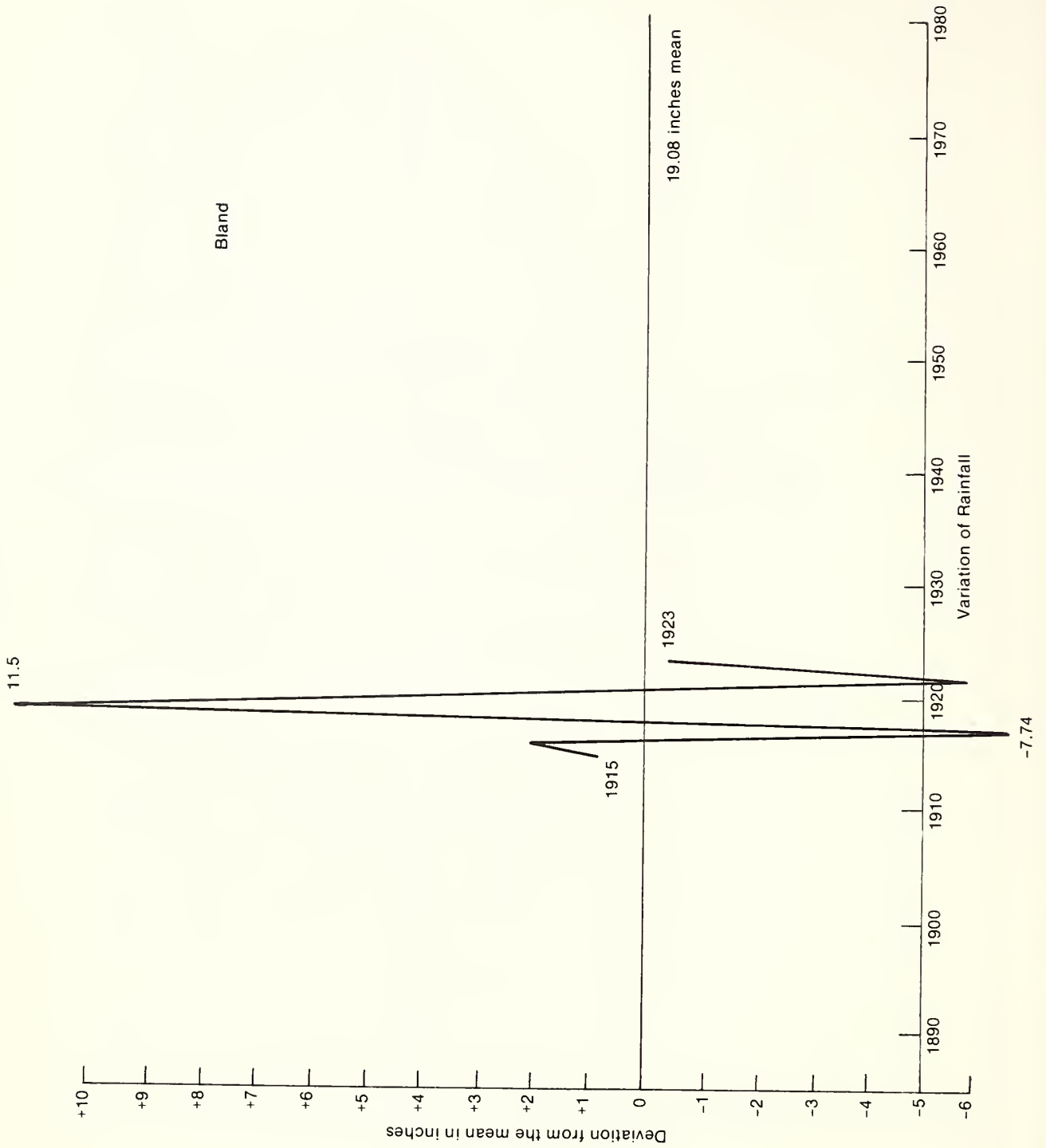


Figure 4, m.

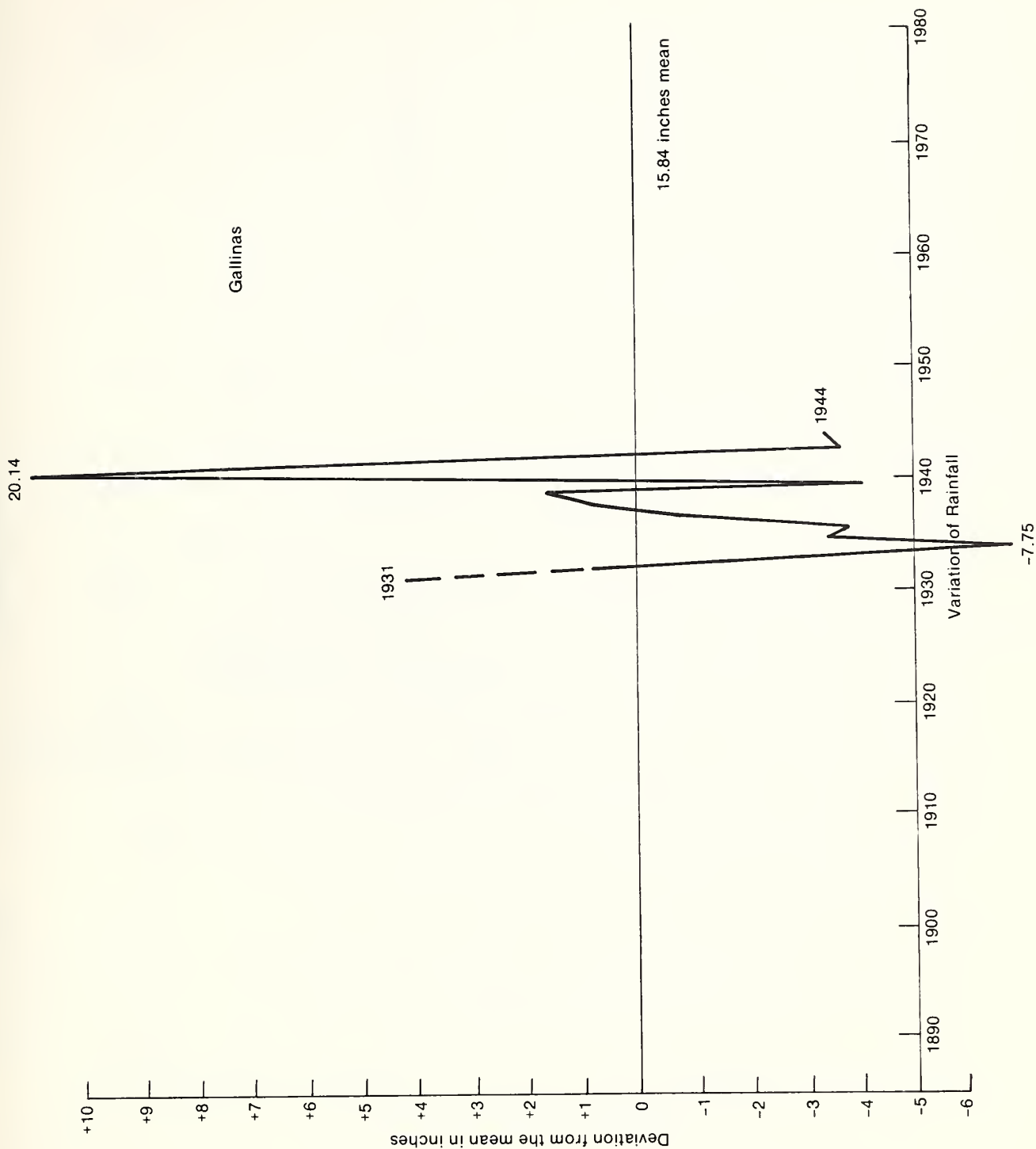


Figure 4, n.

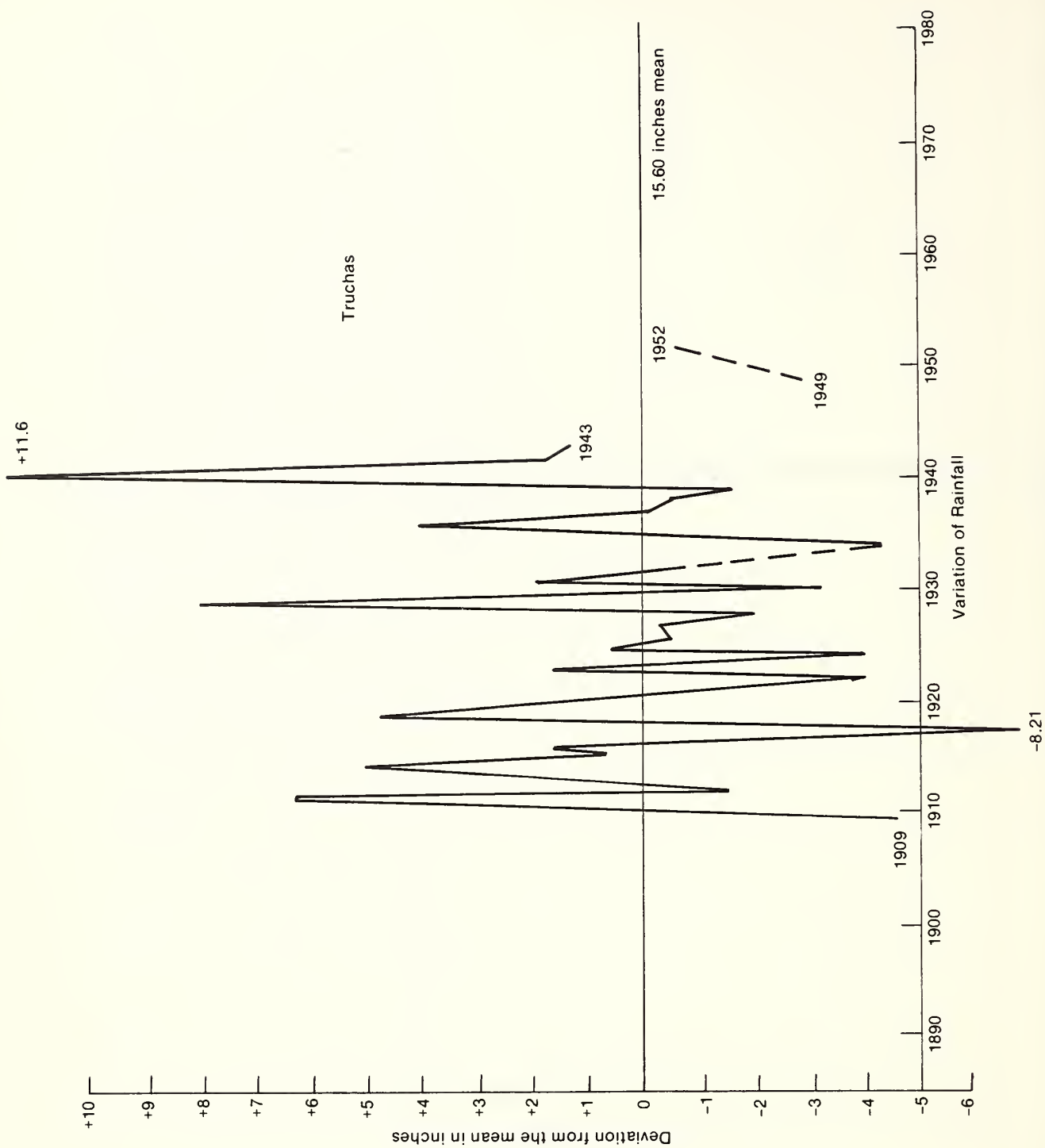


Figure 4, o.

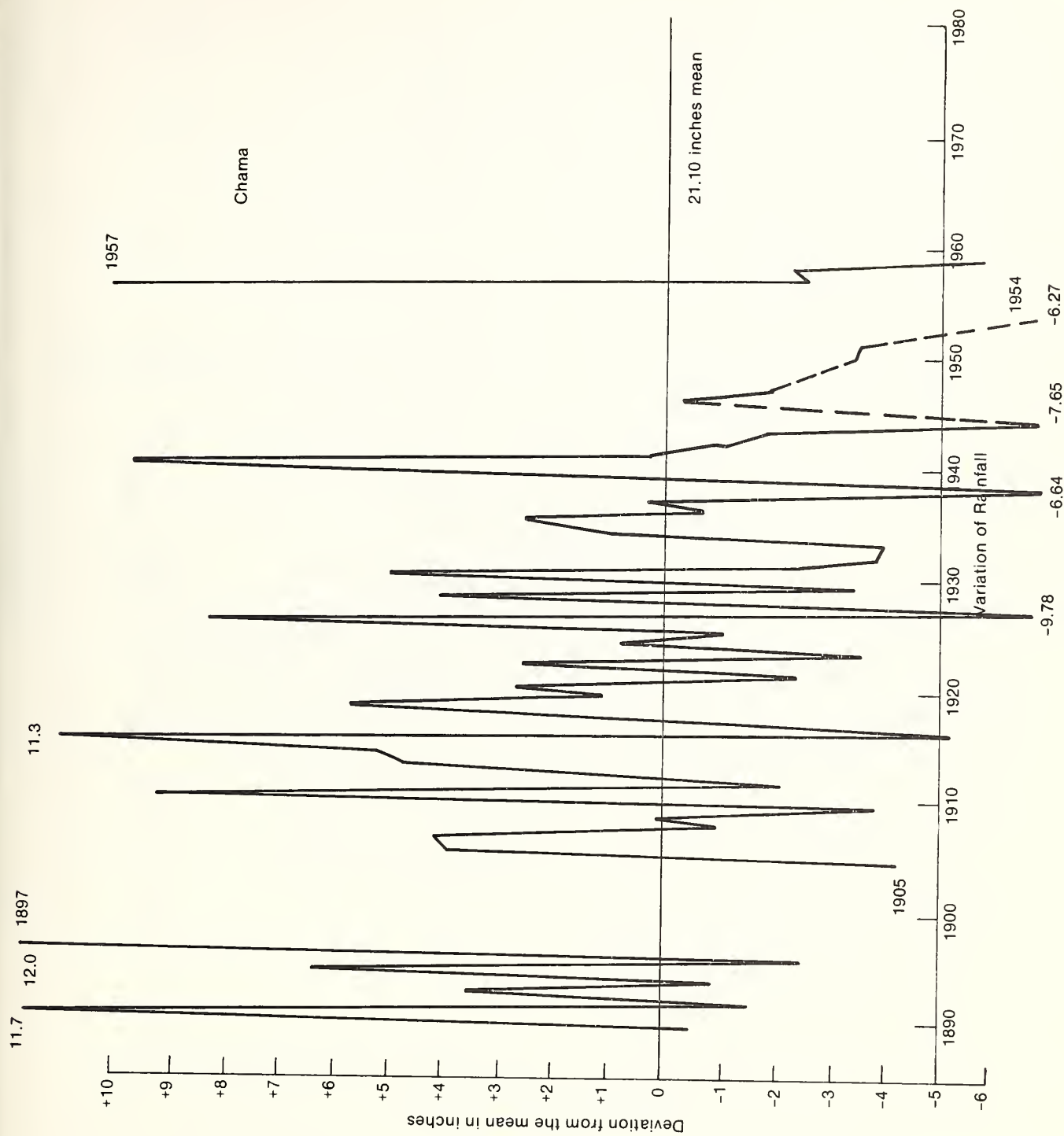


Figure 4, p.

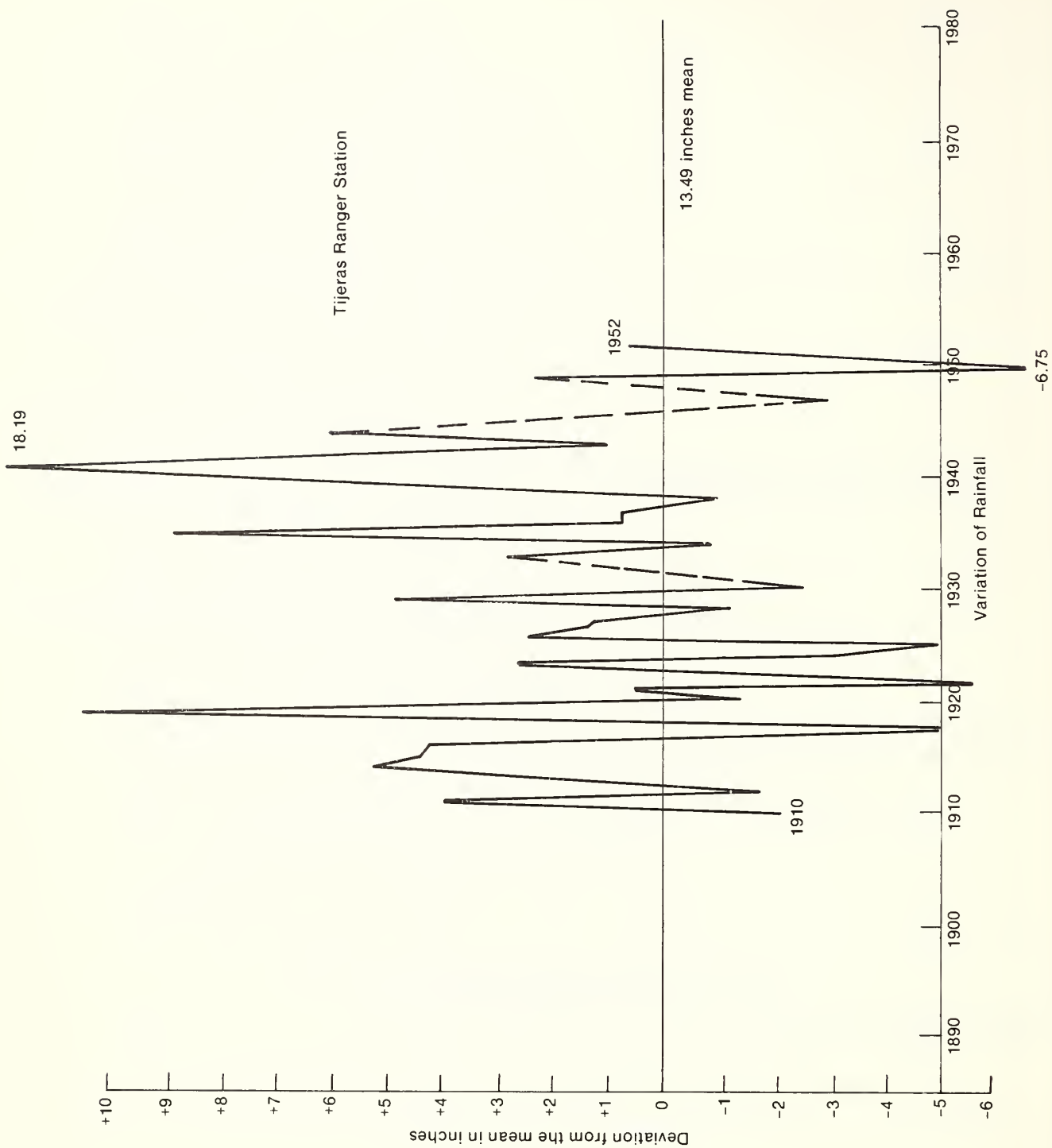


Figure 4, q.



Figure 4, r.

Precipitation depends on the direction of prevailing winds as well as regional topography. In general, large mountain masses act as catchment areas for rainfall, and the correspondance between elevation and precipitation is quite close. Today, about 50 percent of the annual precipitation in New Mexico falls in winter and 50 percent in summer. Summer rainstorms are, however, of short duration and high intensity. The characteristically dry spring allows the ground surface to dry out and become compact so that summer storms may not saturate the soils. Runoff is high and erosion may be severe (McGehee 1963). Palynological data seem to indicate shifts in seasonality in the rainfall pattern during prehistoric times, however; these are discussed below. Particularly important for agriculture is the observation that June, a relatively dry month during the growing season, is also the month of maximum evapotranspiration (Houghton 1959). The geographically spotty distribution of rainfall, particularly in summer when crops are maturing, has long been noted (Map 6 (in map pocket) and Figures 4 a-r). Variability in summer rainfall is most marked in the Gallina area, on the Pajarito Plateau and in Tijeras Canyon (Tuan 1969; Houghton 1959).

In general then, modern data on climate indicate that with respect to the length of the growing season and precipitation, reliance on horticulture is risky. The growing season is not reliably 120 days in some areas. This is true not only in the high areas of the Sangre de Cristos, where a short growing season would be anticipated, but also along most of the Chama above Espanola and in the Red River area of Taos. The fact that these areas are climatically unsuitable or risky for agriculture today does not rule out their suitability in the past, given the possibility of climatic fluctuations.

That annular ring widths in certain drought resistant species of trees vary with the amount of available moisture has long been known (Douglass 1929). Various refinements in constructing past climate from tree-rings have been developed (Fritts 1965; Fritts et al. 1965; Dean and Robinson 1977). Recent paleoclimatic profiles, derived from tree-rings indicate episodes of relatively greater moisture in Chaco Canyon from about A.D. 650 to A.D. 1150, after which there were episodes

during which the climate was drier than average (Dean and Robinson 1977). The tree-ring data for the central Rio Grande area (of Santa Fe) evidence conditons that were drier than present prior to 1200 (Dean and Robinson 1977). The Cebolleta Mesa sequence manifests relatively more moist episodes from about A.D. 680 until 1340, after this period, average or below average precipitation is indicated (Dean and Robinson 1977).

The chart in Figure 2 was derived from the most recently published dendroclimological studies in the Southwest (Dean and Robinson 1977). The chart shows statistically significant deviations both above and below mean ring width for selected sequences within the San Juan and Rio Grande areas. I have followed Dean and Robinson's (1977) caution in plotting only those deviations which exceed two standard deviation units in either direction, because these are considered to have been important in effecting the adaptations of plant, animal and human communities (Dean and Robinson 1977:7). Two warnings must be given in interpreting the chart. First, plots with superscript dashed lines were compiled from data for surrounding areas, because no tree-ring specimens were available for the particular time segment within the area. Second, readers should not attempt to correlate a dry (or wet) interval noted in one area with another area. The significance of deviations in mean ring width must be determined for each locality separately. Thus, if one is interested in deviations in the Albuquerque District, extrapolations from the Santa Fe data are not reliable. The Albuquerque data have not yet been compiled, but will be available soon (William J. Robinson, personal communication 1978).

In a recent study of tree-ring data from five separate areas in the Southwest, Jorde (1977) found that between A.D. 750 and A.D. 1040 most short term droughts lasted for about two years, but from A.D. 1050 to 1349 periods of aridity increased to two and a half to three years. The data suggest that cultural mechanisms appropriate for adapting to short term drought before A.D. 1050 may not have been adequate beyond this date. This problem is discussed further below.

Studies of alluviation and palynology in the Navajo Reservoir District (Dittert et al.

1961; Schoenwetter and Eddy 1964; Schoenwetter and Dittert 1968; Schoenwetter 1966) have been interpreted as indicating changes in the seasonality of rainfall and in the amounts of annual rainfall. The studies suggest that from A.D. 200 to 700 there is evidence of abundant moisture and long winters and general aggradation of streams. Beginning at about A.D. 700 and extending until A.D. 1100 there was a shift to a warmer regime, with rainfall concentrated in the summer. This altered rainfall pattern may have produced arroyo cutting and erosion. The pattern continued through the 12th and 13th centuries, except for a widespread drought between A.D. 1275 and 1300. The dry period lasted into the first decades of the 14th century, but there was a shift in seasonality of rainfall to a winter-dominant pattern and alluviation until A.D. 1850, when the present short winters and summer droughts began another episode of channel cutting. Unfortunately, similar palynological reconstructions for the Rio Grande Valley area are not available at present, however palynological, botanical and faunal data from archeological sites in the Gallina area (Holbrook and Mackey 1976, 1978) may indicate locally drier conditions beginning at about A.D. 1200.

It would be imprudent to rely exclusively on the preceding data to "explain" the archeology of the Rio Grande area. For one thing, methods of paleoclimatological reconstruction are relatively new and refinements are expected to continue in each field. From the information on hand it is undoubtedly safe to infer that there were no great changes in climate over the last 500 years, but variability existed within any one area through time and at any one time from one locality to another. Most importantly, this variability affected the prehistoric population, although not in the same direct way that rainfall deficiency effects crops. Human culture provides a means of adapting to the natural environment and its fluctuations. The paleoclimatic reconstructions provide a background against which various cultural techniques for adaption may be evaluated.

An Ecological Approach

Human beings are capable of alternative courses of action though these are ultimately limited by the natural environment and the size of human populations.

Agriculturalists, for example faced with a decrease in effective moisture, might find it advantageous to shift their settlements to higher elevations. This solution would be efficient only if unoccupied territory was available at high elevations or if amicable relations had been established with groups already in the area and sufficient land for newcomers was available. With these considerations in mind, an examination of past adaptations in the Eastern Anasazi area must be of broad interregional scope and relate to other areas of the Southwest. An examination of the adaptive decisions made by various groups is attempted here. In this exercise, I rely heavily on both archeological and ethnographic examples from areas outside the Southwest. This approach may be considered somewhat heretical, but I believe that it is necessary to expand the comparative horizon, because for the reasons discussed the modern Pueblos do not provide adequate analogs for past adaptations.

The limited data we have on Basketmaker II adaptations are informative, in part, because they are scarce. Sites have been found only in areas where intensive surveys and excavations were undertaken for salvage purposes (the Navajo Reservoir Project) or where modern building activity and subsequent erosion exposed remains (the Albuquerque area). Although corn and habitation structures are reported, I suggest that dependence on horticulture was minimal, and that the sites that we do have represent seasonal occupations. This, in turn, indicates that hunting and gathering must have been critical to the economy and that local groups must have dispersed throughout much of the year. Similar interpretations have been made by others (Glassow 1972; Irwin-Williams n.d.), although an alternative view is expressed by Schoenwetter and Dittert (1968:45). Despite meagre, quantitative data the diversity of fauna and flora from these early sites is consistent with a suggestive broad subsistence base.

Basketmaker III sites have been regarded as indicative of more dependence on horticulture, as evidenced by the shift in location of sites closer to arable land, the presence of numerous storage cists and pits, and an increase in ceramic containers (Glassow 1972). Schoenwetter and Dittert (1968) believe the more moist climatic regime between A.D. 200 to 700 would

have been favorable for this adaptation, but that corn of a low yielding variety necessitated planting larger fields. They suggest that aggradation processes provided the land which made this possible, and that the location of sites in areas of topographic variability offered access to wild plants and game. I propose also a relationship between the increased amount of trade goods in Basketmaker III sites and increased dependence on agriculture, although this covariation may not reflect the accumulation of large quantities of surplus goods, as has been suggested (Eddy 1966:472). Rather, given the unreliable nature of crops from one year to another, increased dependence on agriculture may have also meant that access to wild plant and animal foods would have been essential for coping with years of poor yields. Few societies with shaky economic bases risk maintaining exclusive territories (cf. Steward 1970; Flannery 1972; Waddell 1975), and one way of insuring access to neighboring territory and information about the availability of food outside one's immediate setting is through trade relationships with several other groups of people. It might be suggested also that the kivas at Shabik'eschee and the Navajo Reservoir sites, whatever particular ceremonies took place within them, were important places where members of different communities could meet periodically and exchange information, if not food and other goods (Athens 1977:374; Ford 1972).

Three basic features of Anasazi life which seem to have been established during Basketmaker III; the use of cists, pits and ceramic containers to store immediate surpluses, the maintenance of trade ties to other areas (perhaps as insurance against local scarcities), and the construction of special ceremonial rooms which might have been important in sustaining ties among communities. The few sites which have been found and excavated indicate that regional and community populations were relatively small. Within each community most of the hearths, work areas and storage cists were outside house structures, suggesting that food preparation and storage must have been done in full view of members of the village. Hoarding individual property is virtually impossible under such circumstances, so that communities likely were markedly egalitarian (cf. Fried 1967:27-106). Various ethnographers

(Carneiro 1968:136; Sahlins 1972) have noted that group (village) size in egalitarian societies is relatively small and that conflicts or potential conflicts may be resolved by the fission of parts of the group to form separate communities. Although the factors that condition fissioning of a local group are not agreed upon (as examination of the above citations indicates), the archeological implication of such a process would be a gradual expansion in the distribution of small communities. This may account for the marked increase in the number of villages seen in Pueblo I as well as the expansion of villages into the more mountainous portions of the Eastern Anasazi area.

There are three characteristics of Pueblo I that I believe are interrelated: (1) as noted, villages expanded in number and into more mountainous settings; (2) rectangular surface structures were built, apparently for storage; and (3) a diversity of ceramic types were present at each site. Schoenwetter and Dittert (1968:49) believe that a shift in seasonality of rainfall and a decrease in effective moisture at about this time would have lowered the water table in the Navajo Reservoir District and decreased the amount of land available for planting. Whether or not deteriorating climatic conditions are further substantiated through additional paleoclimatological research, the increased amount of storage space does indicate that people were compensating for periods of scarcity. It may be that the expansion of villages into diverse areas also limited free access to these areas. There would be greater competition for the game and wild plant foods where villagers had moved gradually into the elevations which support the most abundant sources of game, nut crops and berries. Above ground storage does more than provide additional space. One could, after all, dig larger holes in the ground. (The size of the Basketmaker III kivas is good evidence that such labor would not be shirked if it were important.) Above ground storage adjoining habitation rooms, in my opinion, are important for another reason. They provide space which is essentially private (cf. Flannery 1972). Access to such structures may be watched so that others will not know whether or not goods are being hoarded. This suggests a change in social organization from a situation of extreme egalitarianism to one in which access to produce could be limited.

(I do not mean to imply that certain individuals had political authority as in a ranked society, discussed below.) Some corporate group smaller than the entire village, probably existed, although I hesitate to label or define the type of group (ie. whether clan, extended family or some other kind of social unit) (cf. Kroeber 1917; Martin and Rinaldo 1950; Brew 1946). The geographical expansion of villages and the potential for limiting access to produce suggest that styles in decoration of ceramics were additional "social markers."

The observation that ceramics were widely traded and that "local varieties" of types were produced indicate that maintaining alliances and networks of communication among groups was of importance. This argument is derived from Flannery's (1967) interpretation of the function of style in interaction and alliance, but I do not wish to imply that societies of different levels of social complexity (Steward 1955) were involved. The maintenance of social ties among villages in different environmental setting, serves two advantages. First, in times of local scarcity, the potential for obtaining goods from an advantaged group is enhanced. Such exchange, of course, would have to have been reciprocated when situations were reversed. Second, in the case of a real economic disaster, such as a prolonged period of crop failure, it might be possible to move to villages where alliances had been maintained. I am impressed here particularly with Waddell's (1975) account of how the Enga, a highland New Guinea group, cope with famine. Although economic disaster is infrequent, when particularly severe frosts occur in the mountains, entire villages of people abandon their homes and move in with groups at lower elevations and with whom they had maintained trade ties. The homeland may lie abandoned for more than a generation. One need not look as far away as New Guinea to see this kind of mechanism operating. Among Pueblos in the historic period the Pecos moved to Jemez, and the Tano as far away as Hopi during the disruptions of the Spanish conquest, (Kidder 1958; Dozier 1954). A similar mechanism is implied by the observations that Mesa Verde ceramics occurred in the Navajo Reservoir District during Pueblo II, and that in about A.D. 1050 the population of the Navajo Reservoir District apparently moved north to Mesa Verde (Eddy 1966:506). Apparently, the Mesa

Verde populations could incorporate immigrants and cope with their presence, at least in part, through the development of labor intensive agricultural features (Hayes 1964; Rohn 1971).

The data from Chaco Canyon indicate that prior to A.D. 900 techniques for coping with uneven resource distribution and short-term droughts were the same as those in existence elsewhere in the Southwest; i.e., the shift to surface storage structures and establishment of small-scale trade networks (Judge 1976). After A.D. 900; however, the abundance of imported ceramics suggests that Chaco had developed a formalized trade network. Judge (1976:13) thinks that during the 11th century Chaco may have become a center for redistribution, and that turquoise, for which there is abundant evidence, might have served as a medium for exchange. The situation at Chaco is remarkable for a number of reasons, the most significant being that there are no analogs for Chaco among the modern Pueblos, and perhaps none in any contemporary society; that the tremendous growth of Chaco was so short-lived; and that the amount of labor invested in such non-essentials as beautifully decorative masonry veneers must have been enormous. The first two observations involving the lack of analogs and the short duration of the developments are striking in the light of current evolutionary writing in ethnological theory. For example, Fried (1960:713), in discussing the origins of social ranking and stratification, notes that contemporary ethnographic data provide "a murky mirror in which to discern the stages in the development of pristine states." Service (1971:142), commenting on the instability of chiefdoms, notes "the 'rise and fall' of chiefdoms has been such a frequent phenomenon that it seems to be part of their nature." There are important differences between Fried's conception of a ranked society and Service's notion of chiefdoms, but it is not important to label Chaco during Pueblo III as one or the other, because providing a name or label does not increase our understanding of why the phenomena developed. The theoretical discussions are important, in part, because they offer directions for inquiry into features of the Chaco system which might have been important to its rise and demise.

Rank societies and chiefdoms differ from egalitarian societies in that there are a

limited number of positions of status and that the economy is dominated by redistribution (the collection and dispersal of goods) rather than reciprocal exchange among groups or individuals of equal status (Sahlins 1968; Fried 1960; Service 1971). It has been suggested that the development of social ranking may be related to the control of irrigation systems, general population disequilibrium within a region, and/or the control of long-distance trade (Flannery 1972; Athens 1977 and Gall and Saxe 1977 provide detailed discussions of the major issues).

Vivian's (1974) discussion of the irrigation system at Chaco is relevant in that he argues that although each segment of the system, diverting water from one rincon, could be controlled independently, run-off in each rincon would be unpredictable and an integrated system of apportionment would have been necessary. The integration of the system would require some kind of central authority. The discussions of long-distance trade elaborated by Di Peso (1974) are also important in view of the effort expended in road construction, the abundance of turquoise, the debris from manufacturing items of turquoise (Judge 1976) and some of the specific similarities between Chaco Canyon and Casas Grandes. I believe the question of population disequilibrium must be addressed first. If Chaco were undergoing a period of climatic stress, as has been suggested, the least "expensive" solution, (in terms of labor) would probably have been to migrate. However, this option may not have been available, in part because the regions at higher elevations within the vicinity of Chaco already were densely inhabited. I suggest that people who were closer to areas of higher elevation expanded into these areas, as the archeological data from the Gallina and Taos areas suggest, and that perhaps, the only alternatives for the Chacoan groups were those that required tremendous investments of labor and organization (for roads, craft specialists etc.). Perhaps the acquisition of a "valuable resource" (turquoise) enabled the population of Chaco to enhance their security by interacting with Mesoamerican states to the south, providing an item of exchange for economic support. Until necessary documentation of the extent of the redistributive network is analyzed, through the determination of the turquoise source locations of Mesoamerican stones, a process which has

begun (Weigand et al. 1977) and the mechanisms involved in "inter-regional interaction" (Flannery 1968) are better understood, the precise nature of the Chacoan adaptation remains moot.

The archeological data indicate that Chaco maintained ties within the eastern Anasazi area. The roads, for example, lead both north and east of Chaco, in addition to south. Although quantitative data are not available as yet, remains from Bonito sites indicate the acquisition of diverse fauna and flora which were not at hand locally but did occur in more mountainous areas (Vivian and Mathews 1964). Finally, the wide distribution of Chacoan "cognate" ceramics in the Rio Grande area indicate that at least some forms of social ties existed. An outstanding exception may be the Gallina area which, as I have said, appears to have been relatively isolated. The Taos likewise may be an exception. However, as noted above, the data may be biased since no systematic investigation of early Gallina or Taos sites has been undertaken. Alternatively, and from my perspective, more reasonable is the proposition that each of these areas--which are quite high in the mountains--were maintained as neutral "buffer zones" (in the sense that Hickerson 1965 uses this term). My suggestion is that game such as elk, deer, and mountain sheep, and wild plant products, which have been found in Chaco as well as in the Santa Fe area sites (Vivian and Mathews 1964; Traylor et al 1977), were still essential resources and that only relative isolation could insure their continued abundance. It may be significant in this respect that after A.D. 1200, when the Gallina and Taos areas do contain evidence of dense occupation, further constraints seem to have been placed on the economic system. These are discussed below in the context of Pueblo IV adaptations.

The abandonment of the central San Juan during Pueblo III has been addressed from a number of perspectives (Douglass 1912; Jett 1964; O'Bryan 1952; Roberts 1935; Davis 1965; Ellis 1964). I believe that it is useful to distinguish two varieties of abandonment and to keep them conceptually distinct. The first kind of abandonment affects individual sites or very small local areas, and was a feature of Anasazi prehistory from its inception. Rarely did any site remain occupied for longer than about

100 or 150 years (Zubrow 1971; Cordell 1975). This process probably related to a variety of causes, from difficulties in the constant repair of houses, to local conditions of salinization, poor crop yields in any one locality, factionalism or disease (Colton 1960; Titiev 1944; Cordell 1972). The abandonment of vast districts, however is a distinctive phenomenon, and there is no consensus as to its cause. The fact that Chaco Canyon and Mesa Verde were not abandoned at the same time argues against a simplistic climatic explanation. No evidence as yet supports the idea that nomadic groups were either in the area or would have posed any threat had they been. It is more likely that the cause, or causes, were internal and systemic. These might include resource depletion and salinization (related to local agricultural practice), or the failure of the political system to maintain the necessary trade network to support the population or otherwise cope with increasing climatic variability and, perhaps, dessication (Lister 1966; Zubrow 1971; Hayes 1964). Most of the current research in the area continues to be concerned with this problem (Judge 1976; Irwin-Williams 1977; Plog et al 1978).

Related to abandonments are the problems of tracing specific traits in the Rio Grande and Acoma - Laguna areas to the San Juan populations (Windorf and Reed 1955; Stubbs and Stallings 1953; McNutt 1969; Ellis 1964). As mentioned, archeologists working in the Rio Grande have been troubled by the lack of a constellation of traits (ceramic types and details such as kiva orientation, lack of benches and pilasters) at Rio Grande sites, while noting the marked increase in population in the area during Pueblo IV. It is in this context that I believe a re-evaluation of the long term mechanisms for coping with minor stress are valuable. If one accepts the evidence that trade and alliance networks were standard features of Anasazi adaptations, then it is reasonable to propose that when abandonment became necessary the San Juan groups, probably gradually, joined the local population to the east and southeast, integrating themselves into communities in much the same way as the highland Enga do (Waddell 1975). Thus, the apparent dispute between whether or not the large Pueblo IV sites are the result of local population growth or immigration may be viewed from a different

perspective emphasizing that migrants could lose many distinctive attributes during the process of their incorporation into ongoing communities. Again, one need not look further than Jemez or Hano to see how difficult it would be to discern such a migration archeologically. Further indications of the adaptability with which Pueblo groups were able to integrate and incorporate others are provided by the various defensive "refugee sites" founded following the Pueblo Revolt of 1680 and de Vargas' reconquest of New Mexico in 1692. These sites, consisting of stone "pueblitos," were occupied by various Pueblo people who had been joined by, or joined, both Apache and Navaho.

The evidence for migration into the Rio Grande area, rather than comprising constellations of specific traits, is manifest in the marked increase in population instability in the area during Pueblo IV. As discussed, numerous sites were abandoned during the Rio Grande Classic at different times during the Classic and not associated with any particular instances of widespread drought. I suggest that the long term stability of the Eastern Anasazi region, outside of the San Juan, which has been attributed to "marginality" to the San Juan (Wendorf and Reed 1955) prior to 1400, was the result of proximity to the mountainous buffering zones. For example, within the middle Rio Grande the time at which villages appear varies considerably. As noted, in both the Albuquerque and Cimarron districts Basketmaker II villages have been shown to date within the appropriate temporal period for Basketmaker II elsewhere in the Southwest. However, the Taos, Chama, Pajarito and Santa Fe areas show considerable "lag." This has been interpreted as representing marginality, in that much of the Rio Grande was viewed as isolated from more progressive areas. The evidence from both Albuquerque and the Cimarron, which are even more geographically isolated and distant from the San Juan than the rest of the area, makes the notion of marginality untenable. It would appear that until the 1400's the mountainous areas provided an outlet for local population increase, since in essence, people could become hunters and gatherers if necessary. Following the abandonment of the Chaco area, however, this outlet was not sufficient for the numbers of people in the eastern area. The added constraint, I

believe, is reflected by the large and unstable aggregated communities of Pueblo IV. The grid gardens along the Chama and in the Picuris area, the terraces and grids of the Pajarito Plateau, as well as the expansion of groups into the Plains margins in the salinas district, indicate that intensive efforts were being made to support a relatively tremendous population increase. It is not surprising, given even minor climatic fluctuations, that many of these efforts would be failures; that pueblos would be abandoned, and new communities founded.

During the historic period, not only did the presence of Athabascan speakers, Utes, Spaniards and Anglos constrain migration and relocation, but the introduction of livestock destroyed most of the wild resources that would have been available during times of stress. What we seem to see among the modern Pueblos is a remarkable adaptation considering that two of their former means of coping (reliance on wild food sources and migration) are no longer open.

Culture History

As a final comment on the prehistoric archeology of the Rio Grande, I would briefly like to discuss the results of another large segment of the research which has been carried out over the past 50 or so years. These efforts have been directed toward tracing the origins of specific Pueblo cultural traits and specific groups of people.

Attempts to determine the linguistic affiliation of various prehistoric groups has had a long history in the Anasazi area (Mera 1935; Ford, Schroeder and Peckham 1972) with few substantial results. There are at least two major problems in establishing linguistic ties for archeologically known populations. First, there are excellent ethnographic cases of two linguistically diverse groups sharing essentially the same material culture inventory, such as the Hopi and Hopi-Tewa (or Hano) of Arizona (Dozier 1954, 1970). Second, although the historic and contemporary distributions of related languages in the Pueblo area does show geographic patterning, the assumption that geographic patterning in ceramic types or architectural features represents linguistic patterning is

both untested and probably untrue (Dozier 1970). We have yet to establish a relationship between language and the type of ceramics manufactured, and despite the fact virtually all ethnographic studies indicate that there is no relationship between the two (Dozier 1970; Brugge 1963; Turner 1977), this line of enquiry is still being pursued (Ford, Schroeder and Peckham 1972).

A similar problem is encountered in attempts to trace the origins of specific ceremonial features, such as the masked dances of katchina ceremonies, and relating these to architectural features. For example, the ethnographically known masked dances are developed most elaborately among the western Pueblo groups, developed secondarily among the Rio Grande Pueblos, and not at all at Taos. Masked dances are rituals involving the whole community, and among modern Pueblos take place in large community buildings (Ellis 1950). Large kivas, recognized archeologically, and kivas with very elaborate features, such as the Great Kivas of the San Juan, are more numerous west of the Rio Grande, where they additionally have considerable time depth (Vivian and Reiter 1965). With these data in mind, archeologists have suggested that the masked dances of the katchina ceremonies originated in the west and were introduced into the Rio Grande area. Although logically reasonable, excavations in the Tsegi Canyon area of northeastern Arizona at sites which date to A.D. 1250 to 1300 yielded no artifacts which could be associated with the katchina ceremonies (Dean 1970). Recent studies of rock art (Schaafsma and Schaafsma 1974) showing complex masked figures and kiva murals representing katchina figures, may indicate that these are older in the southern Rio Grande area than they are in the west. The suggestion made is that although katchina ceremonies were first introduced into the Rio Grande Pueblos and later spread west, the long period of prohibition of the ceremonies by the Spaniards makes them appear less developed today in the Rio Grande. Although this argument is not definitive, largely because rock art is notoriously difficult to date and interpret, it does highlight a major problem of Anasazi archeology. Put simply, the problem is that we must seek to determine how appropriate the modern Pueblos are as analogs for their ancestors. This is

not meant to be glib. It is well-known that modern Pueblo groups are "conservative" (Dozier 1970; Ortiz 1979). However, the ethnographically known Pueblo Indian cultures have been disrupted, because they have had to cope with massive incursions of outside groups. It has been about 400 years since options which were once available were closed by the presence of outsiders.

The documents, artifactual and written, of the historic period, as well as the diversity of ethnographic detail records for various Pueblos, may serve best as a long-term record of mutual acculturation and adaptation. The historic period in the study area, addressed below, reflects this approach.

SOUTHERN ATHABASCAN (DINE)

The historically known Navajo and Apache speak Athabascan languages which relate these peoples to various groups in the interior of western Canada, Alaska and the Pacific Northwest Coast. At the time of the Spanish Entradas the southern Athabascans occupied land which surrounded and interdigitated with Pueblo land. Although anthropologists acknowledge the theory that race, language and cultural adaptations should not be expected to be completely congruent, this is often ignored in the context of culture history studies in the Southwest. Tracing the beginnings of Athabascan residence in the Southwest continues to be a difficult problem, in part because these peoples have displayed considerable adaptive flexibility over time; this is reflected in their settlement patterns and items of material culture available for study by archeologists. Glottochronological studies indicate that the southern Athapaskan speakers may have diverged from their northern linguistic relatives from about one thousand to 600 years ago (Hoiyer 1956). Although Huscher and Huscher (1942, 1943) have argued, on the basis of circular masonry houses and pointed bottom pottery forms found in Colorado, that the Athabascans followed a route through the Rocky Mountains to the Southwest, Hester (1962) places their route farther east by way of the Plains of western Nebraska, Kansas and eastern Colorado. The current consensus favors the Plains route, and some genetic data seems to support this (Spuhler 1978). If the Athabascans did enter the Southwest by way of the Plains, they might have obtained knowledge of agricultural practices from Plains groups before they entered the Southwest. It is interesting in this regard that the name "Navajo" probably derives from the Tewa terms nava (field) and hu'u (canyon) (Harrington 1920, Loumala 1938, Dutton 1975). Most scholars currently place the arrival of the Athabascans in the Southwest shortly before that of the Spaniards; however, recent studies of dental morphology from skeletal remains dating from A.D. 1075 to 1190 from the Trinidad Lake area of Colorado, may indicate the presence of Athabascans at this very early time (Turner 1977). If this date is substantiated, it is important to note that the ceramics accompanying the

burials from Trinidad Lake are derived from Rio Grande types and would not have been recognized as Athabascan (Turner 1977). The difficulty in defining, and, therefore, recognizing, the earliest Athabascan adaptation (whether hunting and gathering or hunting and gathering combined with some agriculture) and material culture (circular stone dwellings or tent rings, pointed bottom ceramics or Rio Grande-like wares) highlights one of the problems of Athabascan archeology.

The earliest historical references to Apache groups appear to be those of the 1541 Coronado expedition. The people identified as Querechos (later Vaqueros) were encountered in the New Mexico--Texas panhandle region (Schroeder 1973:124). Later Entrada accounts also mention Lipanes, Faraones, Jicarillas and Carlanas living east of the Manzano, Sandia and Sangre de Christo Mountains (Oaks 1978 map). The earliest historical reference to the Navajo appears to be the 1629 account of Fray Geronimo Zarate-Salmeron who was told by the Jemez of "Apaches de Nabaju" living in the Chama River area (Loumala 1938). Recent archeological work in the Piedra Lumbre Valley (Schaafsma 1976) may support the notion that Navajo were in this area prior to 1696. The evidence consists of 33 archeological sites and isolated artifacts including hogans, sheep pens, stone structures, sherd areas, lithic scatters and hearth areas (Schaafsma 1976:73).

Three aspects of the 17th century Navajo remains in the Piedra Lumbre Valley are worthy of comment. These are settlement configuration, ceramics, and projectile points. Modern Navaho adaptation requires considerable residential mobility with concomitantly small residential group size. The archeological sites in the Piedra Lumbre Valley consisting of two hogans are consistent with this view. In addition, importantly, two large village sites (AR-4 and AR-33) and an other possible large village site (AR-130) covering areas of about 50,000 m² indicate that the early Navajo adaptation supported large, sedentary communities (Schaafsma 1976:103-104; 73). Based on his work west of the continental divide, Brugge (1963:19) suggested that 17th century Navajo ceramics probably were of a generalized woodland

type produced by a paddle and anvil technique. Gunnerson (1969) and Gunnerson and Gunnerson (1971) describe Ocate Micaceous ware, found at Apache sites near Ocate and Cimarron, New Mexico, and in Dismal River Apache complexes in Nebraska, as being distinct from similar micaceous ceramics produced at Picuris and Taos. Ocate Micaceous generally is a black ware in a widemouth olla form according to the type description (Gunnerson 1969:26-27) it differs from Penasco Micaceous from Picuris and Vadito Micaceous from Taos (Dick 1965), in being thin (1.5-6mm). Schaafsma (1976:164-169), however, found that the ceramics from the possible Navajo sites in the Piedra Lumbre Valley were indistinguishable from Picuris and Taos wares and suggests that they were probably made at those pueblos. He states "personally I wonder if Ocate Micaceous can be separated from Penasco Micaceous if only sherds are examined" (Schaafsma 1977:164). It should also be noted that similar, if not identical, ceramics were produced at Nambe Pueblo in the 17th and 18th centuries (Ellis 1964, Schaafsma 1976).

Other ceramic types found in the excavated Piedra Lumbre Valley were all apparently from contemporary Rio Grande Pueblos. These include Tewa Red-on-buff (Carlson 1965) or simply Tewa Red (Schaafsma 1976:162), Tewa Black and Tewa Gray (Schaafsma 1977:163-171). It would appear that on the basis of ceramics, it would be impossible to differentiate 17th century Navajo, Apache or Northern Rio Grande Pueblo sites. This is important primarily in the context of site survey and ceramic scatters. Finally, prior to the recent work in the Piedra Lumbre Valley, no "Navajo" projectile point forms had been described, and Hester (1962:50-51) suggested that they did not manufacture points. Based on excavations at AR-4, AR-130 and AR-133, Schaafsma isolates what he regards as an early Navajo point type that compares to points found in excavations in the Navajo Reservoir District; the latter were unusual in not resembling Pueblo forms (cf. Hester and Shiner 1963:53). These points are triangular with side notches and a deep, V-shaped basal notch, producing flaring basal tangs. The points described by Schaafsma (1976:154) are between 24mm and 27mm in length. Five of seven specimens are of white chert, while two are of glassy

obsidian which "almost certainly originated in the Southern Jemez" (Schaafsma 1976:154).

From the available Spanish records, as well as the archeological remains, it appears that during the 17th century the Apaches (including the Navajo) were living in the middle and northern Rio Grande Valley area and prior to Spanish contact were at peace with their Pueblo neighbors, or at least enjoying considerable trade with them. The eastern Apaches were particularly involved in trading salt from the salinas east of the Manzano Mountains to Picuris and Taos (Bolton 1916). Following the Pueblo Revolt and de Vargas' Reconquest of New Mexico in 1692, Pueblo and Navajo refugees lived together in the Largo-Gobernador area. This Refugee Period was, naturally, one of considerable Athabascan-Pueblo interaction. Refugee sites consist of masonry "pueblitos," which are defensively located but impressive in their extent (Brugge 1963); they are numerous in the Jemez Mountains and in the Largo-Gobernador region. Ceramics associated with refugee sites indicate that the Navajos may have been producing jars with pointed bottoms and a few bowls of what is referred to as Dineta Utility ware (Brugge 1963). The notion that pointed bottom forms are predominantly Athabascan is unreasonable in view of the fact that these forms occur in late Gallina Phase sites, as discussed above. During the Refugee period, the Navajo also produced a distinctive polychrome pottery (Gobernador Polychrome) which was influenced by several contemporary Pueblo styles. The ware is generally orange with designs painted in red, black and white (Brugge 1963:19). Archeological evidence from the Largo-Gobernador region indicates that by 1700-1750 the Navajo probably already had the Night Chant, since masks, ceremonial paraphernalia and rock art relate to this ceremony (Hester 1962:121, P. Schaafsma 1972:40, 41; Schaafsma 1976:197).

Brugge (1963:20-21) considers 1750 as the beginning of a transitional period during which several changes leading toward more recent Navajo patterns began. First, the polychrome ceramics became more variable in form and of inferior quality. The resultant type, Navajo Painted, also declined in quantity, much of it eventually being produced for ethnographers and other whites and for ceremonial use.

After 1800, the utility wares, Navajo Utility and Pinyon Utility, show changes which relate both to increased mobility and "ethnic identity." Changes linked to mobility are the use of sherd temper, which produces a sturdier paste, an increase in wall thickness, and rounded bottoms and cylindrical bodies; shape modifications which make transportation somewhat easier. Finally, decoration consisted either of an applied or molded fillet around the neck of jars. This decorative treatment, which has Plains antecedents, was modified by a Navajo pattern with a "ceremonial break" in the fillet ridge.

Athabascan house types show considerable variability through time and in space, as well seasonal variability within any one area. Apache sites in the eastern foothills of the Sangre de Cristos were adobe "pueblo-like" structures of up to eight houses. Hearths within rooms were central or built against one wall, while interior floor features might include bell-shaped storage pits. Extra-mural roasting or baking pits are characteristic. Other Apache sites in the same area consist of the remains of "tipi" villages. Houses are circular, generally 10-12 feet in diameter, with depressed floors and central fire pits. Outside roasting pits and baking ovens are present as well (Gunnerson 1969:23, 32; Terrell 1974:53). In 1719 an Apache group, probably Jicarilla, were living in an adobe village near Ocate, growing corn and maintaining irrigation ditches, according to (Gunnerson 1969). Navajo hogans may be circular or polysided stone buildings or polysided cribbed log structures (cf. Kluckhohn, Hill and Kluckhohn 1971). Reichard (1928) and Luomala (1938) note seasonal patterns, with tents being used by Navajos during the summer and hogans in winter. A series of hogans and corrals might be built at various sheltered places near water, grazing land, and fuel; foothill and mesa locations were used in winter and lower elevations in spring. Navajo sites may include hogan remnants with an ash or charcoal heap to the east, corral walls or areas denuded of vegetation which had been corrals, and the remains of brush shelters or ramadas. Sweat houses, because these are usually built in the sidewalls of arroyos (out of sight of hogans) may not always preserve. Navajo tent camps, consisting of a tent base and one or two ovens with little cultural debris,

may be all that remains of a summer sheep camp (Luomala 1938, Allen *et al.* 1975:133, Richard A. Goddard, personal communication 1977).

It is clear that distinguishing Athabascan sites from Pueblo sites and camps will often be difficult, while eastern Apache and Navaho sites probably cannot be distinguished without historic records. Schaafsma (1976:200) makes the generally sound suggestion that the Apaches near Picuris and those in the Chama River area probably were basically the same group of people. "During the seventeenth century the Apaches living in the Chama River gradually acquired the name "Navajo" and those to the east acquired the name 'Jicarillas'" (Schaafsma 1976:200). In any case, the Navajos of the Chama area apparently did not return after the Refugee Period. To add to the confusion another group of people, the Eastern Ute, also used both the Chama Valley and the Taos basin.

The Ute language is spoken by Eastern and Western Ute, Southern Paiute and the Chemehuevi (Goss 1972). Ute is not related to Athabascan but to the widespread "Utoaztecan" family of languages, which includes Hopi and other languages. The Eastern Ute generally are regarded as affiliated with the Great Basin cultural tradition, but they also had various "Plains" traits related to buffalo hunting (Stewart 1977:1). The Eastern Ute had relationships, both friendly and hostile, with the Rio Grande Pueblos, the Navajo, the Jicarilla Apache and the Spanish. Apparently, the Utes were known to and traded with the Jemez at least as early as 1598 (Lummis 1900:182-183, Stewart 1977:3). In 1694 Governor Vargas reported meeting with Apaches near Taos and with Ute in the same area, who complained that the Apache were in their territory (Espinosa 1936:185, Stewart 1977:20). The Moache band of Eastern Utes, until 1878, were in south central Colorado and in New Mexico on the Maxwell Ranch east of Taos. The first peace treaty the Utes signed with the United States (December 30, 1849) was signed by a Moache Ute chief at Abiquiu, placing the Utes in the Chama Valley at that time (Stewart 1977:9). Both the Moache Ute and Jicarilla Apache were administered together by the United States, first from Taos and later on from the Maxwell Ranch, on the Cimarron River

(Stewart 1977:21). The Utes had a long and unusual relationship with the Spanish. Prior to the Pueblo Revolt, many Utes were kept as slaves, having been sold to the Spanish by other Utes. Thus, they quite early learned the use of the horse, and Stewart (1977) suggests that they may have been instrumental in introducing the horse to the Comanche. Utes also frequently acquired land as Genizaros, and became Hispanicized to some degree in Genizaro settlements, especially Abiquiu (Swadesh 1974, Stewart 1977). The Ute apparently traded with the Navajo and acquired a great many Navajo blankets (Schroeder 1965). On the other hand, the Utes acted as guides for Kit Carson when the Navajo were rounded up and forcibly removed to the Bosque Redondo area (Fort Sumner) in the Long Walk of 1863.

That the Utes lived in and among the Pueblo, Apache and Spanish settlements of northern New Mexico is evident. As with the Apache, distinguishing the remains of Ute camps would be exceptionally difficult, if not impossible. The Utes, like the Jicarilla, used tipis. Intertribal intermarriage was frequent and, according to the comparison of "traits" used in the culture element surveys, the Wiminuche Ute shared more elements with the Jicarilla than to any of the other 19 southwestern tribes used in the study (Stewart 1977:22). There is some confusion as to whether or not the Eastern Ute made pottery; Stewart (1942:341) was told by an informant that some Moache women made pottery, but the informant thought they had learned this skill from the women of Taos. In any case, as with "Ocate Micaceous" vs. "Penasco Micaceous," it would be virtually impossible to distinguish the wares. Other implements known to have been employed by the Eastern Utes are also non-distinctive. They used beamers of deer or elk bone as did Apache and Plains groups. Stone tools included metates and mullers which could not be differentiated from similar items used by the Pueblos (cf. Stewart 1977:29). Probably most significant is that the Utes frequently salvaged Archaic projectile points and used them (Stewart 1977), and it is not surprising that the only point types that Schaafsma (1976) found in the "tipi" ring sites in the Piedro Lumbres Valley were Archaic forms. Since the Utes were highly mobile and seem to have ranged all over the mountainous areas of southern Colorado and northern New

Mexico, it is quite likely that many of the isolated Archaic (and perhaps PaleoIndian) points found in these areas are the result of their activities.

ASSESSMENT OF THE PROTOHISTORIC PERIOD

As mentioned at the beginning of this section, language and race do not necessarily coincide with cultural adaptations. The northern Pueblos of Taos and Picuris speak Tiwa. The Jemez are Towa speakers, and both Tiwa and Towa are classified in the Tanoan language family. The Navajo and Apache speak Athabascan languages related to languages spoken in far northern North America. The Utes are linguistically related to the Hopi and Chemehuevi. Recent studies of genetic distances among a sample of 50 North American tribes indicate that the Eastern Navajo are related most closely to the Jemez (Spuhler 1978), probably reflecting, in part, their association during the Refugee Period. Unfortunately, the Utes were not among the 50 tribes used in the sample; however, I would hazard the guess that they are most closely related to the Jicarilla. I think the cautionary lesson for the archeologist is clear: cultural "traits" such as ceramic types are not informative with respect to language group or genetic affiliation. On the other hand, a positive lesson may be drawn that relates to the meaning which we, as scientists, attribute to form. The lesson also is one of scale.

I suggest that most of the formal attributes which archeologists believe monitor "style" or "cultural affiliation" are functional and, for that reason are potentially extremely informative with respect to the kinds of adaptations pursued. If Brugge (1963:20-23) is correct about the "cermonial break" in the fillet around the neck of Navajo ceramic jars being a distinctive ethnic "stamp," and I believe he is, the chances of archeologists recognizing patterning in minor elements such as this for unknown prehistoric peoples are minimal. Recognition of a distributional pattern of such minor elements would, it seems, be virtually impossible. Attributes which could be considered functional should, I believe, be studied within very large scale frameworks (both temporal and spatial). Further, I believe that minor elements

should be monitored at a much finer scale than we currently attempt and that the finer scale must derive substantive content from methods outside of anthropology

(such as genetics, minerology or physics, depending on specific questions), or, if methods are derived from anthropology, they must be experimentally replicable.

HISTORIC PERIOD

My training and experience are not in history or in historic site archeology, and consequently, my approach to historic resources will differ from that familiar to most historians. Rather than discussing the chronology of events, or an evaluation of documentary and archival resources, or the background details of various political and social movements, I provide the reader with a guide to the more available historical works which do treat these matters. I approach cultural resources from the

perspective of an anthropologist in that I will examine the kinds, features, and distributions of material remains which accompanied activities such as farming, ranching, mining and timbering during the historic period. I have indicated the major historical events in New Mexico on Table 4, as a general reference. Further, much of the relevant material in this section is presented in the form of maps (Maps 7 through 15).

Table 4

KEY DATES IN THE HISTORY OF THE CENTRAL AND NORTHERN RIO GRANDE, NEW MEXICO

1540 - 42	Francisco Vasquez de Coronado Expedition
1581	Francisco Chamuscado Expedition
1582	Espejo and Beltran Expedition
1598 - 99	Onate's Conquest of New Mexico
1598	First Capital Founded at San Gabriel de Yunque
1610	Capital moved to Santa Fe
1680	Pueblo Revolt
1696	De Vargas' Reconquest Completed
1706	Villa founded at Albuquerque
1776	New Mexico placed under the jurisdiction of the Comandante General of Sonora
1776	Escalante and Dominguez Expedition
1786	de Anza's Treaty with the Comanche
1806	Zebulon Pike taken prisoner
1821	Treaty of Cordova. Mexico Independent from Spain
1821	Becknell opens Santa Fe Trail
1822	Cimarron cut off opened
1829 - 1830	Spanish Trail (to California) opened
1828	Gold Discovered in the Ortiz Mountains
1834	First Printing Press brought to New Mexico (by Josiah Gregg)
1836	Governmental Reorganization under the Departmental Plan
1837	Revolt in the north, Governor Perez killed

1839	Governor Armijo retakes Santa Fe
1846	New Mexico surrenders to Kearny
1846	Construction of Fort Marcy (Santa Fe) begun
1847	Taos Revolt (Governor Bent killed)
1848	Treaty of Guadalupe Hidalgo
1850	Territory of New Mexico created
1854	First Protestant Church founded in Santa Fe
1862	Battles of Valverde and Glorieta Pass
1863	Mescalero Apache removed to Bosque Redondo
1863	Long Walk - Navajo removed to Bosque Redondo
1866 - 1913	Gold and Silver "Boom"
1891 - 1903	Land Grant Claims adjudicated
1875	New Mexico given Archdiocesan Status
1880	A.T.&S.F. Railway in Albuquerque, "Chili Line" to Espanola
1889	University of New Mexico and Agricultural College at Las Cruces founded
January 6, 1912	Statehood
1913	"Sandoval Decision" - Pueblo Indians claimed as U.S. wards
1914 - 1929	Taos Society of Arts, Santa Fe Artists Club, New Mexico Art Museum, Harwood Gallery (Taos), and New Mexico Art League (Albuquerque) founded
1924	Pueblo Land Board Created
1943	Los Alamos taken over for Manhattan Project

HISTORICAL LITERATURE

A concise and accurate history of New Mexico is available in the work of Jenkins and Schroeder (1974). Twitchell's classic (1911) 5 volume summary on the major events of New Mexican history was reprinted in 1963; Jenkins' (1967) work is a guide to the archival material of the Spanish period, while her 1969 guide (Jenkins 1969) deals with the archives of the Mexican period. The three publications pertaining to the Historic Preservation Program for New Mexico (Cultural Properties Review Committee 1971, 1973a, 1973b) contain good thematic reviews and bibliographical information. Finally, Ellis (1971) provides selected historical documents.

Materials which are useful for the period

of Spanish exploration and initial settlement include the edited documents in Hammond and Rey (1953, 1966), Thomas (1935), and Bolton (1950). The New Mexico Missions are treated by Scholes (1930, 1937); Dominguez (1956), and Parsons (1966). The social, economic and religious background of Hispanic settlement is given especially good coverage in the works of Swadesh (1974), Fisher (1942), Weigle (1975, 1976a, 1976b), Gonzalez (1969) Dozier (1970), Spicer (1962), Simmons (1968), Chavez (1954a, 1954b, 1974), Scholes (1942), and the bibliographical references provided in these works. In this regard, Weigle (1975), 1976b) presents comprehensive annotated bibliographies of works pertaining to Hispanic communities.

Discussions of Pueblo-Hispanic interactions and the Pueblo ethnography of the historic

period are so extensive that not all of the more important sources can be listed here. Nevertheless, Dozier (1970) provides a good basic introduction. Saunderson's (1944), Swadesh (1973) and Shelton (1954) contain annotated bibliographies. Francis (1956), Hawley and Senter (1946), Johansen (1948), Siegel (1959), Knowlton (1964), Swadesh (1974) and Spicer (1962) have produced analyses of comparative acculturation and Ortiz (1969, 1972), Aberle (1948), Dozier (1961), Ellis (1964a, 1964b), Ford (1968), Jones (1966), Lange (1959), Parsons (1925, 1936), Reed (1943), Smith (1966), Trager (1967), White (1932, 1935, 1960), Whitman (1947) and Harrington (1916) are some of the standard sources of information about the Pueblos during the historic period.

Bloom (1913-15), Forbes (1960), Gregg (1968), Weigle (1976a) Burma (1949), Dozier (1969), and Leonard (1970) contain information specifically related to the period of Mexican Rule in New Mexico. Unfortunately, this period is not as well synthesized in available documents as it might be. However, it was during the Mexican period that trade with the United States began, and histories of this trade and of the experiences of various entrepreneurs, "mountain men," and explorers comprise a voluminous literature. Among the more useful references are: Rittenhouse's (1971) bibliography of the Santa Fe Trail (Map 10) and the works of Gregg (1952), Gregg (1954), Brown (1963), Moorhead (1958) and James (1966). Information on the Treaty of Guadalupe Hidalgo and subsequent boundary disputes with Texas may be found in Hammond (1949), Rippey (1926), Binkley (1920) and Ganaway (1944).

Colton (1959) and Keleher (1952) specifically address Civil War operations in New Mexico (Map 11). Most of the works dealing with Indian groups during the historic period contain bibliographical references to materials on Indian - U.S. military encounters. In addition, Baldwin (1969), Frazer (1965) and Schroeder (1973) should be consulted. Christiansen and Kottowski (1963), Meinig (1971), Reeve (1964), Trimmer (1974), Harper, Kalvaro, Oberg and Cordova (1943), Weber (1973), Sanchez (1967), and Swadesh, Vigil and Ochoa (1976) provide concise histories and cover issues relating to land grant questions and recent man-land relationships.

References related to various themes

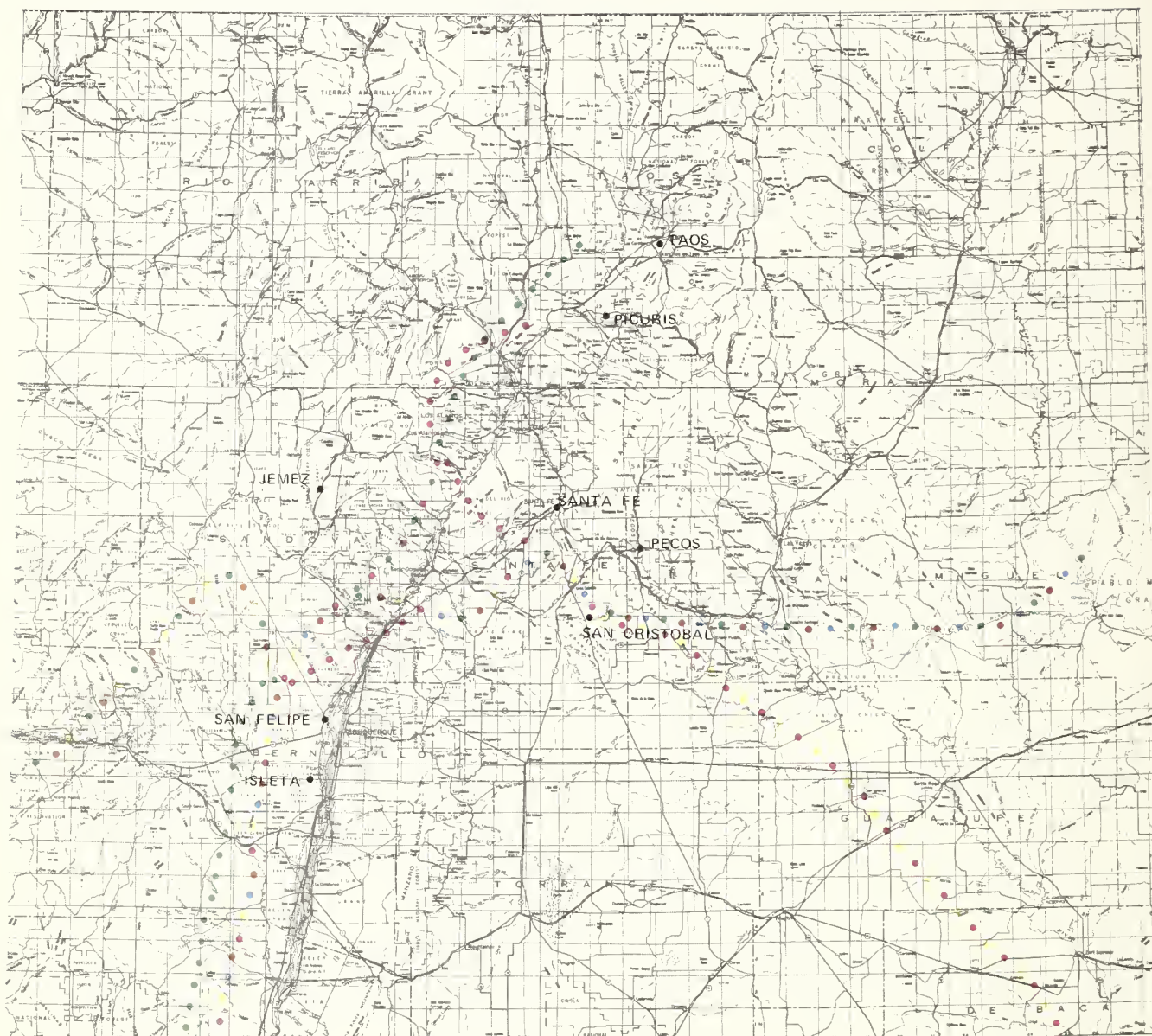
discussed here (farming and ranching; mining, roads and railways) are given in the text. Finally, when information about a particular area or historic site cannot be located in published sources, the materials of the New Mexico State Records Center in Santa Fe should be consulted.

EXPLORATION AND EARLY SETTLEMENTS

Map 7, provides a general reference to the early Spanish explorations in New Mexico. From an anthropological perspective it is informative to note that the earliest expedition into New Mexico, under Fray Marcos de Niza, did not reach the study area, but ended at Zuni. Because de Niza was in search of the "cities of Cibola," the fact that the journey led to Zuni often is glossed as a typical example of Europeans being misled by Indian guides. The real importance of the direction of the expedition, as well as those of Father Kino in Arizona and Coronado in New Mexico, is that the guides were Indians, and that they did not travel the route of the Rio Grande River. Nearly every discussion of migration routes I have seen considers Indian trails in terms of the use of major drainage systems and rivers. Yet it was not until Onate's 1540 expedition that the ford at El Paso was "discovered" and systematic use of the Rio Grande route begun. Given both the geographic setting of places such as Mesa Verde, Chaco Canyon, Casas Grandes, and Zuni as well as the routes of the earliest European explorers, it seems likely that the important Indian trade and travel routes led past various seeps, springs and playas rather than along the rivers.

Swadesh (1974:12) uses the term "culturally Spanish" to refer to the early Spanish settlers in New Mexico, and it is an apt designation. New Mexican settlers were largely either Mestizos (people of mixed Spanish and Indian ancestry) from Mexico, or Hispanicized Indians from Mexico. Even various officials were Creoles (people of Spanish descent who were born in the Americas) rather than Iberian Spanish. Aside from the interesting genetic composition of this population, it might be expected that despite whatever official policies the Spanish government promulgated regarding colonists, these would be both loosely interpreted and filtered by

SPANISH EXPLORATION & 17th CENTURY MISSIONS



- CORONADO (1540)
- CHAMUSCADO-RODRIGUEZ (1581)
- ESPEJO (1582)
- CASTANO DE SOSA (1590)
- ONATE (1598)

Map 7.

the culturally heterogeneous backgrounds of the settlers. This condition is reflected both in patterns of land use and in material culture items. New Mexico was at the extreme northern frontier of the Spanish Colonial world, and probably because it did not provide tremendous mineral wealth, was rather more trouble than it was worth to the Spaniards. Not only was distance from the major Spanish communities in Chihuahua and Mexico City great, but transport was exceptionally difficult. It could take longer for goods to reach Santa Fe from Mexico City than it did for products from Mexico City to reach the Philippines by ship (Stephen Horvath, personal communication 1976).

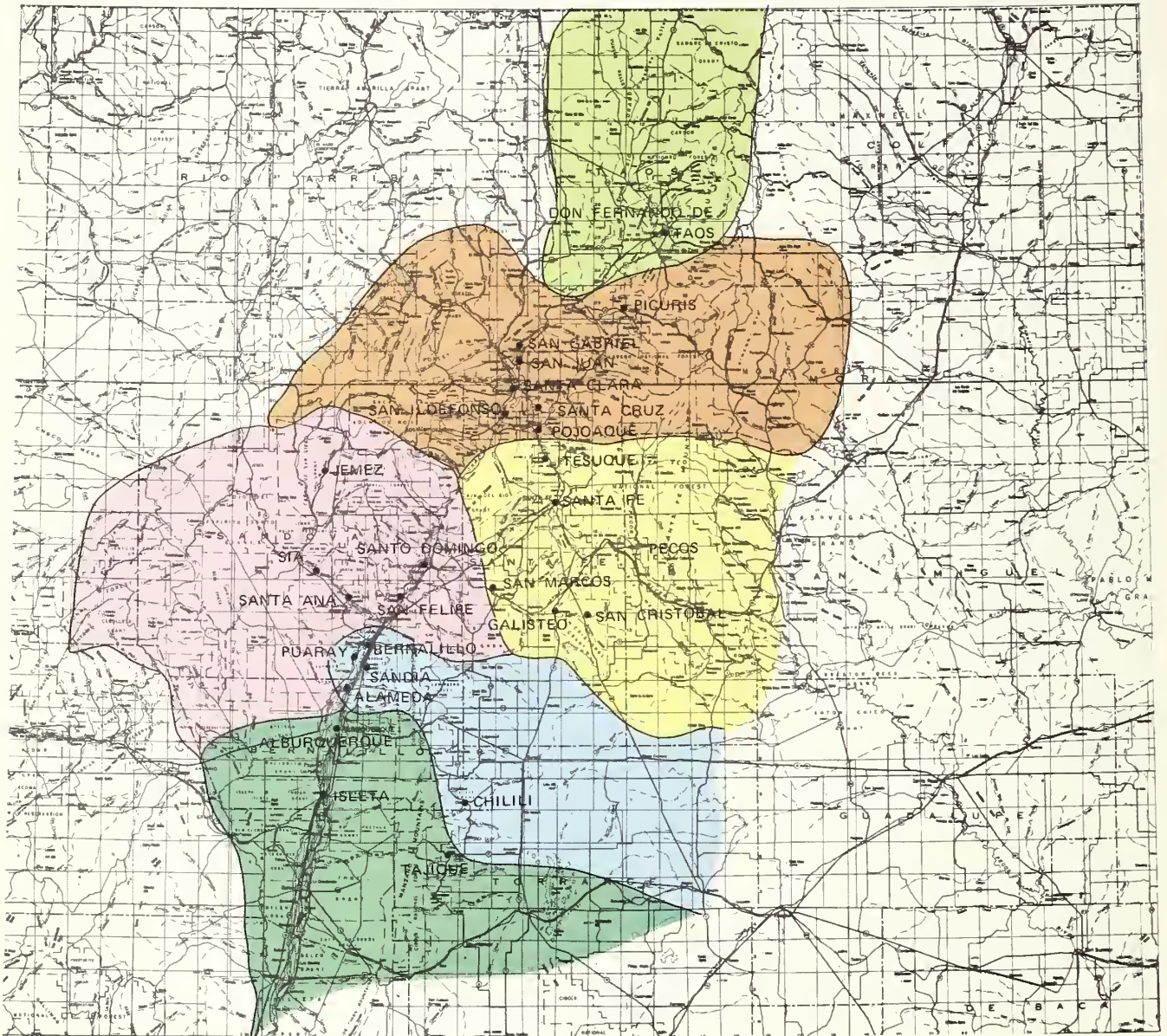
Items of metal and manufactured goods were extremely scarce among the New Mexican settlers. Thus, the ceramics found on 17th and early 18th century Hispanic sites are predominantly the same wares as those reported for contemporary Indian communities while materials used in house construction were represented by local resources almost entirely. Further, under certain circumstances, culturally Spanish settlers might live in Indian communities, and detection of this coresidence from material remains would be virtually impossible. Maps 7, 8, and 9 reflect the difficulties of discerning Hispanic settlements in two ways. Map 7 shows known Spanish missions of the 17th century. Archival records mention that missions were to have been established at other Indian communities as well. One of these, within the study area, is Paa-ko, but no mission structure was encountered during the excavation (Lambert 1954). For this reason, although there may have been a resident cleric, Paa-ko is not noted on the map. Map 8, which depicts Spanish settlements and administrative units, indicates Spanish residents at the Pueblos. This reflects only the presence of an administrative official and not communities of colonists. As archeological sites, it is unlikely that these Pueblos could offer evidence of Hispanic residents.

Simmons (1969) notes a change in colonial settlement patterns between the 17th and 18th centuries. During the 17th century the pattern was one of large landholdings (haciendas) located close to Indian settlements, which provided labor under the encomienda system. The only formally organized Hispanic community until the

Pueblo Revolt was Santa Fe. The majority of 17th century colonists lived along the Rio Grande north of Santa Fe and from Santo Domingo southward to Belen, but this "culturally Spanish" population numbered under 3,000 persons (Simmons 1969, Swadesh 1974:12). One component of LA 591, the Las Majadas site (Snow 1973) in White Rock Canyon about 3 miles north of Cochiti Pueblo, was a mid-17th century Hispanic ranch complex. It comprised a five room house with associated corrals. As might be anticipated, the artifacts associated with the occupation largely consisted of Indian ceramics, stone manos and metates, scrapers and spindle whorls. Snow (1973:43) indicates the Indian items were associated with domestic functions. Spanish handcrafted items were rare and form a functionally distinctive assemblage that included gun flints, bits of chain mail, a metal point and nails. Luxury items were restricted to a small amount of imported majolica ceramics and a turquoise stone. Observations of interest are: the house was solidly constructed, apparently with a view to permanence, the size of the corrals and the faunal remains indicate that ranching was the most important economic activity, and the site was not precipitously abandoned or burned during the Pueblo Revolt. Faunal remains demonstrate that sheep were the most common animals. Domestic cattle were present, but members of the genus Equus (including horses, burros and mules) were rare. Snow (1973) suggests that the site may have been occupied by "nuclear kindred families" in what Swadesh (1974) refers to as a joint residence, that is, a structure with separate entrances for each family.

Apart from the excavations at Las Majadas and as yet unreported work at San Gabriel de Yunque and Santa Rosa de Lima de Abiquiu, 17th century domestic colonial sites have been sadly neglected, reflecting in part an emphasis on excavations of missions and churches. Yet the study area is ideally suited for addressing anthropological questions for which domestic sites are critical; such as the artifact patterning at missions and churches as compared to that at hacienda sites, the comparison of Spanish colonial settlement patterns with those of the British and French (cf. South 1978), and tests of general models of frontier patterns recently proposed (South 1977a, 1977b). Although documentation for 17th century

SPANISH SETTLEMENTS & ADMINISTRATION UNITS (1540-1821)



- ALCALDIA OF TAOS
- ALCALDIA OF SANTA CRUZ DE LA CANADA
- ALCALDIA OF THE QUERES
- ALCALDIA OF ALBUQUERQUE
- ALCALDIA OF SANTA FE
- ALCALDIA OF SANDIA

Map 8.

MEXICAN ADMINISTRATIVE UNITS 1820 — 1848



● PARTIDO CAPITAL
- - - APPROXIMATE PARTIDO BOUNDARY

Map 9.

settlements is generally not as available or abundant as for the 18th century, Hackett (1937), Hackett and Shelby (1942), Swadesh (1974), and Swadesh, Vigil and Ochoa (1976) provide enough information to determine where many of the original communities were located.

Following the Pueblo Revolt and de Vargas' reconquest, the 18th century colonial pattern shifted away from large land grants and haciendas to smaller land holdings and an associated rancho settlement pattern. Simmons (1969:11) attributes the change to a decrease in the Indian population which reduced the labor supply, and to an increased number of colonists. Although official Spanish policy provided precise specification of community arrangements, featuring a grid system of parallel streets, rectangular blocks with one or more rectangular plazas, and surrounding commons, pastures and municipal lands this pattern was not followed in New Mexico (Simmons 1969; Swadesh 1974). Rather, the dispersed community pattern of farmsteads was characteristic. Reasons cited for the nature of the settlement pattern include adjustment to terrain, necessitated by available agricultural technology; protection of herds from Indian raiders; the importance of illegal crops and trade, and patterns of inheritance and land tenure (Swadesh 1974:133-136, Simmons 1969:13). The scarcity of metal tools precluded clearing benchlands along the rivers of heavy stands of pinon or sage, and narrow discontinuous bottomlands were used for cultivation. Dispersed sheep herds were considered better protection against Indian raids than corrals which could be breached. In the Chama area, punche (semi-domesticated tobacco) was grown illegally for trade with the Utes and other nomadic Indians, and a dispersed settlement pattern assured that close official monitoring of such activities was at a minimum. Agricultural plots were long narrow strips, reflecting the necessity for stream or irrigation ditch access and the Spanish custom of subdividing plots among all heirs (Swadesh 1974:19, 133-136, 147; Simmons 1969). Therefore, although each community might have a church and plaza as a focal point for community activities, settlers lived in scattered ranchos until late in the 18th century when increased raids by equestrian Comanches, and sometimes Utes, encouraged the building of defensive plazas, such as those at Chimayo,

Las Trampas, Truchas, Taos, Cebolleta and Ojo Caliente (Simmons 1969). Even then, the Indian Pueblos were more secure than the Spanish plazas, and colonists might take shelter within them, as they did frequently at Taos (Jenkins 1966).

PATTERNS OF LAND USE AND SETTLEMENTS

Remains in the study area which document the colonial way of life include agricultural features, physical manifestations of patterns of land use, and structure types. Agricultural features comprise acequias (ditches), such as the impressive Acequia Madre de Chamisal y Ojito in the Taos Valley (Lopez 1975:47) and canoas (flumes) used to divert water across small canyons. Patterns of land use, which might be monitored initially through aerial photography, include old field patterns and grazing land, the latter possibly indicated by denudation. Types of structures encompassed houses of jacal (post and adobe, or mud) and of adobe brick, ramadas and torreones (towers), which might be free-standing or built on the corner of a residence. Swadesh (1974:138-139), while noting that colonial house types have not been fully documented, distinguishes two major classes of larger domestic structures in use in the Chama Valley area; sectional houses with ramadas and plazuelas (structurally unified houses with enclosed patios).

Swadesh (1974:144-145) relates different types of residences to group, size and proposes that the latter is functionally related to economic conditions. Poorer families, principally herders, maintained small single structure households with adjacent corrals and ramadas. Larger and wealthier families built sectional houses or plazuelas that facilitated cooperation in the sharing of tasks and food. Further, Swadesh (1974:145) suggests that a population of about 100 individuals, including at least 20 able-bodied men, was the minimal size necessary for a kin-based plaza unit to survive the hazards of Indian raids. Many plaza communities were abandoned for considerable periods of time during the height of raiding activity. The proposed relationships among economic conditions, house type, population size, and community longevity can be tested through archival and archeological research. For example,

the soil management reports and maps available for many of the Forest Service Ranger Districts contain enough data to stratify land units with respect to agricultural and grazing potential. One could then test the association of small households and relatively poor land. Archival data contain census material which may be appropriate for determining thresholds at which various types of settlements were no longer viable.

Both Swadesh (1974) and Simmons (1969) discuss the kin aspects of colonial settlements, with the former suggesting that household groupings were largely uxorilocal. A combination of archival and archeological research should address the problem of variability in patterning of architectural and artifactual correlates of group size and kin composition. Such analyses could be compared to the prehistoric data presented in Holschlag's (1975) treatment of changing household composition among Indians in the Taos District.

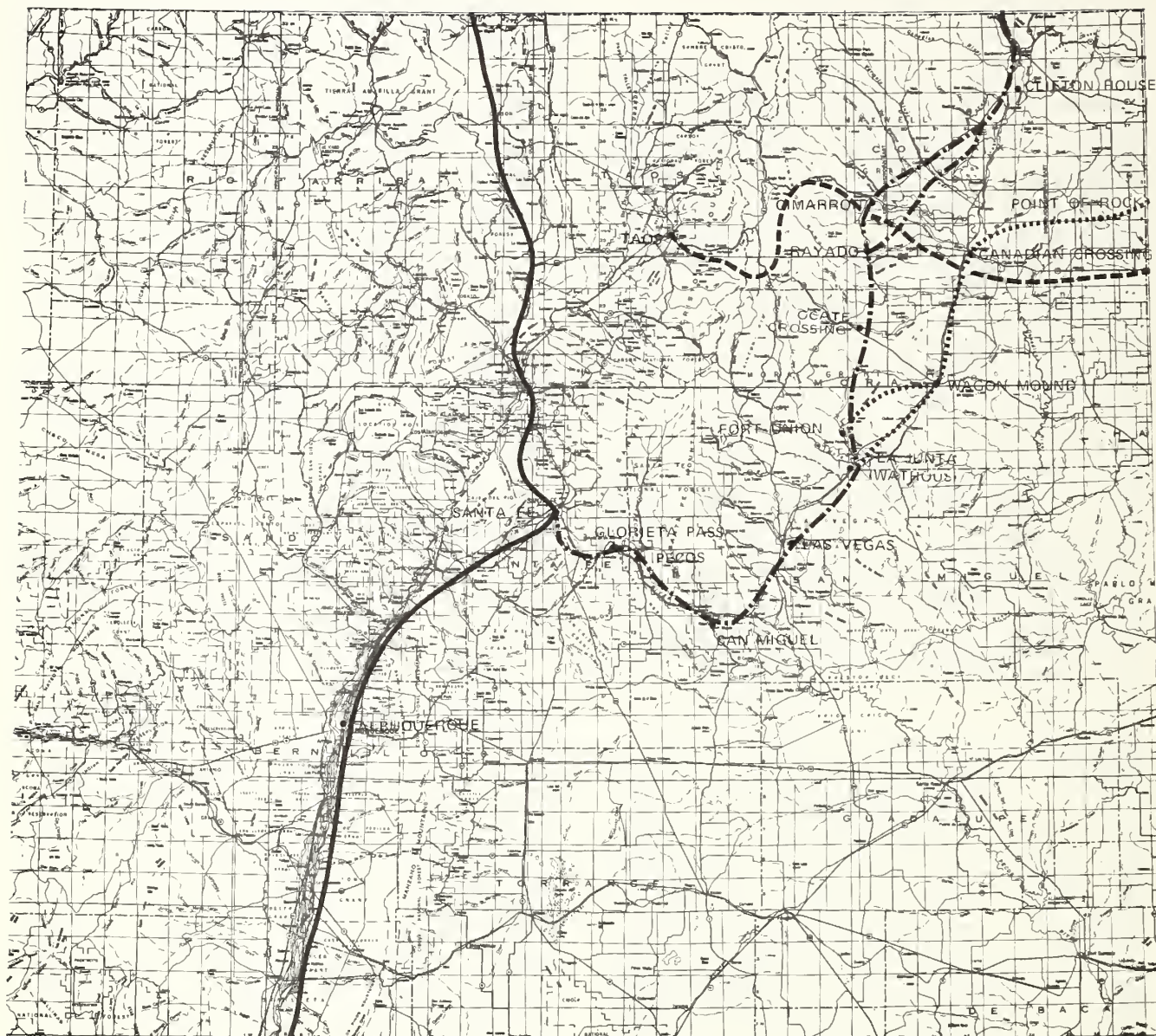
Material culture items found on Colonial sites and on contemporary Indian sites should be useful indices of acculturation, syncretism and rates of change. There are no reports of this type in the study area; however, the discussion by Ward, Abbink and Stein (1977) indicate the direction which such work might take. Berge (1968), and Abbink and Stein (1977) provide descriptions of historic artifacts and suggestions for their classification.

Data from the study area should be appropriate for testing hypotheses about the spatial and material correlates of functionally and ethnically variable settlements. For example, Cattle, Carroll and Stuart (1977) have defined differences in the technology and material culture of shepherding activities between Laguna and Jicarilla. Similar studies of sheep and cattle husbandry among Pueblo, Apache and Hispanic communities would be useful. Several communities in the study area were founded primarily as Genizaro settlements. (Genizaros were detribalized Indians who adopted Hispanic culture and were given grants to establish communities which were geographically peripheral to the areas of major colonial settlement and served to protect frontiers.) The most famous Genizaro settlements were at Abiquiu, Tome, Belen and San Miguel (Santa Fe), but they were present also at Caornuel

(Tijeras Canyon), Ojo Caliente and elsewhere (Dozier 1970; Swadesh 1977, 1978). Questions about the Genizaro settlements amenable to archeological and ethnohistoric research include the degree to which the quasi-military functions of these grants are reflected in settlement and material culture. (For example, they might be expected to contain more gun flints and metal items than ranchero settlements). It should be possible also to monitor the amount of interaction Genizaro communities maintained with non-Hispanicised Indian groups and with Hispanic colonial settlements. For example, at Abiquiu some of the Genizaro settlers were Hopi (Swadesh 1975:35), and it would be of interest to know if trade relations were maintained with the Hopi villages of Arizona, and if so whether these declined over time.

Events during the early 19th century changed the political and economic structure of New Mexico, but the implications as reflected in the archeological and historical records have not been fully explored. In 1803 the purchase of the Louisiana Territory from France by the United States may have opened the possibility of illegal trade in American manufactured goods such as firearms, cloth and agricultural tools (Abbink and Stein 1977:161; Kenner 1969:52). In 1821 the Republic of Mexico was founded, and almost immediately initiated legal trade with the United States over the Santa Fe Trail (Map 10) and by way of the Comanchero trade network (Kenner 1969). In addition, Anglo merchants, ranchers and other settlers soon came to New Mexico. The increase in population and livestock is evidenced in that after 1800, the population of various traditional Pueblos (Santo Domingo, Taos and Zuni) varied in response to rainfall (Zubrow 1974). Whether rural Hispanic communities were affected similarly has not been studied but should be. During the Mexican Period raiding by nomadic Indians was intensified, because the Mexican government could not afford to continue the supplementary aid which the Spanish had supplied (Abbink and Stein 1977:161). Raiding forced the abandonment of numerous communities and the consolidation of some settlements. Data for a comparative study of those communities that failed or were successful should be collected. Population and locational information might indicate the factors that were responsible for the differential survival rate of

SANTA FE TRAIL



- MOUNTAIN BRANCH
- CIMARRON CUT OFF
- ZEBULON PIKE (1806-07)
- SIBLEY-BROWN (1825-26)

Map 10.

settlement. An analysis of variation in the incorporation of types of trade goods in Hispanic and Indian communities would be useful for studies of acculturation rates, while patterns of artifact distributions in early Anglo settlements could be compared with similar data from frontier communities elsewhere in the United States (cf. South 1977b).

During the Mexican-American war General Stephen W. Kearny took Santa Fe (1846) and claimed New Mexico as a territory of the United States. Territorial status became official with the treaty of Guadalupe Hidalgo (1848), but more important changes for the population of New Mexico were the result of the Civil War, the establishment of U.S. military forts and stage routes in New Mexico (Maps 11 and 12), the Homestead Act of 1862, the Indian wars and eventual formation of Ute, Apache and Navaho Reservations, and the arrival of the first railroads in 1880. The establishment of military forts had two effects, the gradual introduction of limited cash into the economy (through Army payrolls) and the expansion of the sheep grazing industry (to provide meat for the troops and later for markets both in the east and west). Both the Homestead Act and the removal of hostile Indians after the Civil War encouraged land speculation and an increase in the number of Anglo settlers and ranchers. Due to U.S. misunderstanding of traditional Spanish and Mexican law and boundary disputes involving overlapping Land Grant claims among Hispanic communities, these communities lost most of the communal grazing land which had provided their major economic base. The introduction of the railroad firmly tied New Mexico's economy to the rest of the United States. It provided opportunities for wage labor and encouraged the development of mining, as well as making goods from the industrialized east available for the first time on a major scale.

MINING

Map 13 and Tables 5 and 6 provide information on the locations and materials mined within the study area prior to 1920. Good discussions of the history of mining in New Mexico, and in the study area in particular, may be found in Northrop (1975), Anderson (1956), Chase and Muir (1923),

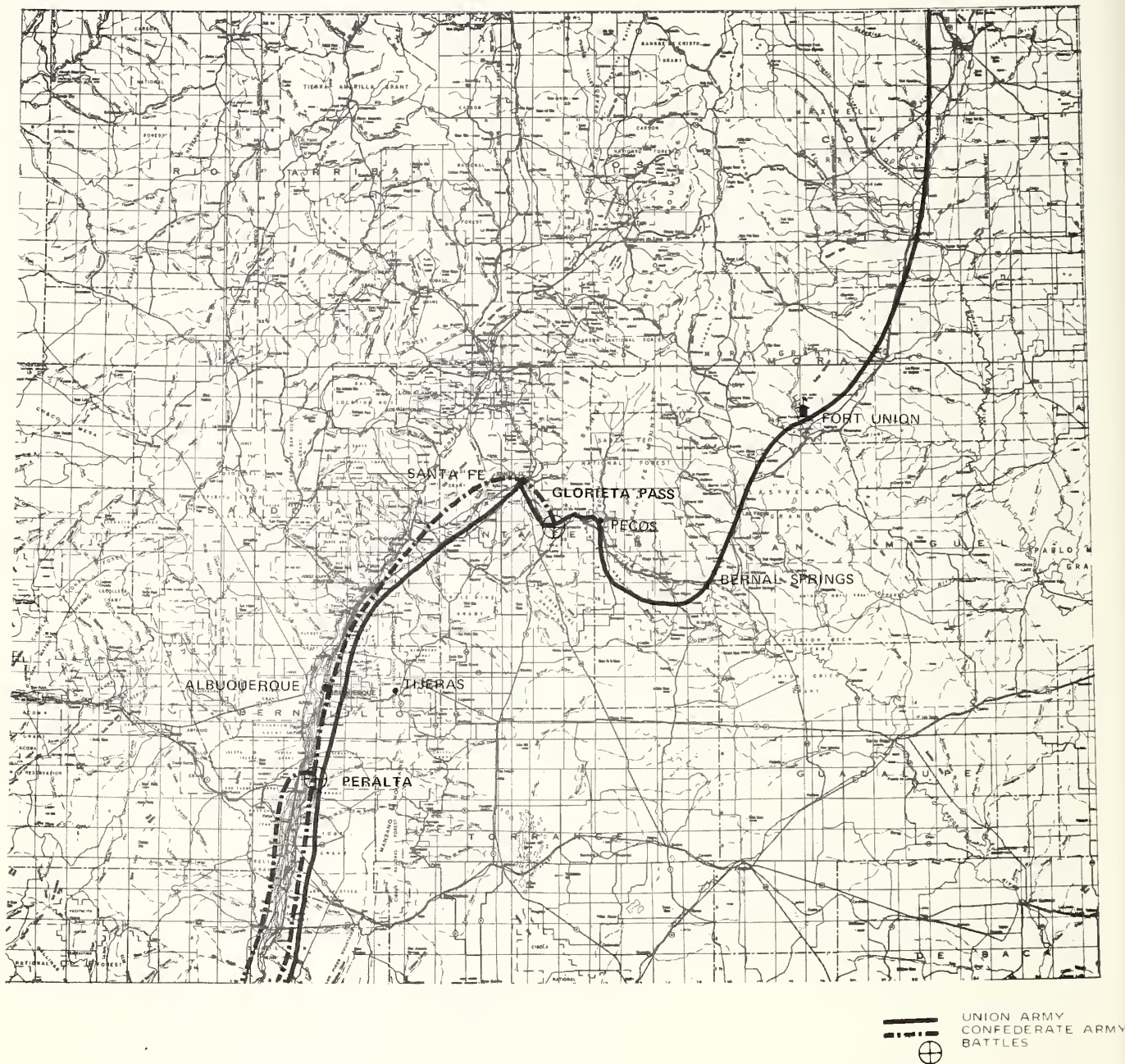
Bingler (1968), Pettit (1966), Schilling (1960), and Miller, Montgomery and Sutherland (1963). Prehistoric mining activity was limited to quarrying chert and other cryptocrystalline rocks for flaked stone tools, and turquoise and a few other minerals for pigments and jewelry. Known sites of these activities are the Cerro Pedernal area of the Chama District (Warren 1976), basalt outcrops in the Taos District (Hume 1974b), and the Cerrillos turquoise mines (Northrop 1975). Sources of good clay for ceramics and mud for adobe were undoubtedly "mined" throughout the study area by the prehistoric Indians. Whether or not galena, used in the production of glaze pigment for ceramic decoration, was mined is not known. It should be possible to determine galena sources through trace element analysis, but I know of no attempts to do so. In general, both the nature of deposits of the cryptocrystalline rocks, turquoise, clay, adobe, and galena, as well as the available technology indicate that the prehistoric mines and quarries will be represented by rather shallow pits and tunnels, perhaps with associated tools such as hammer stones (Northrop 1975:52).

The early Spanish explorers did considerable prospecting (Snow 1973). Prior to the Pueblo Revolt the Spanish, with Indian labor, mined gold, silver, and copper in Taos County, silver and gold from the Ortiz Mountains, and gold (and perhaps copper) in Tijeras Canyon, and salt from the salinas of Estancia. There is, however, some dispute as to how extensive these early Spanish mining operations were, despite the fact that the oppression of working in mines is cited as one of the factors responsible for the Pueblo Revolt (Northrop 1975).

Following the Pueblo Revolt and the Reconquest, Spanish mining operations were resumed, and smelters and slag, apparently associated with mining of this period are described for Tijeras Canyon (Northrop 1975:13). In addition, mica was used extensively for window panes in Santa Fe and probably was obtained from the Ojo Caliente, Petaca and Nambe Districts (Northrop 1975 and Map 12).

During the Mexican Period placer gold was discovered in the Ortiz Mountains; however, Bregg (1958) indicated that the amount of gold extracted between 1832 and

CIVIL WAR MILITARY OPERATIONS



Map 11.

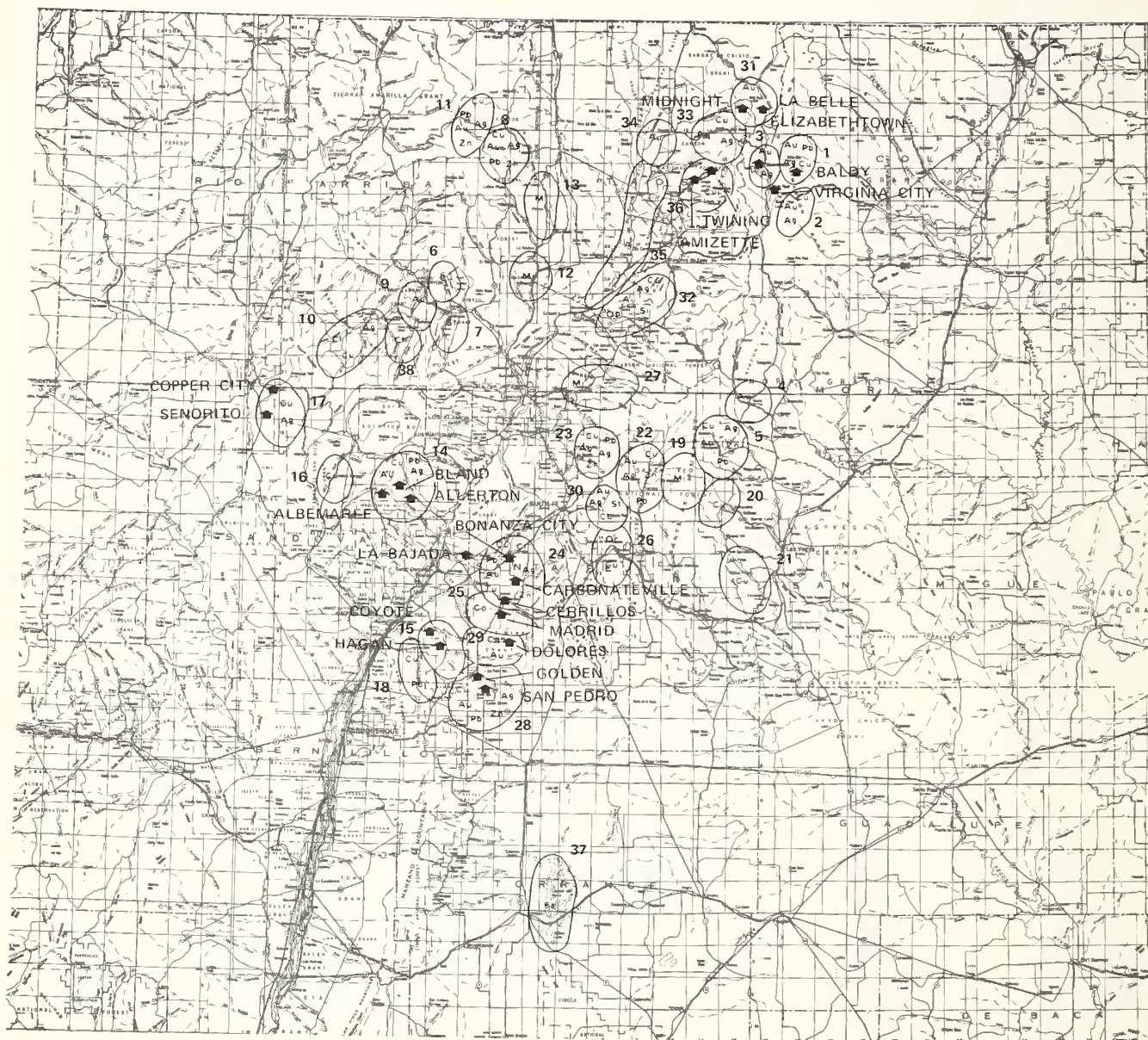
U.S. FORTS & STAGE ROUTES



● MAJOR STAGE STOPS

Map 12.

MINING DISTRICTS PRIOR TO 1920



- | | |
|-------------|----------------------|
| Cu - COPPER | Mi - MICA |
| Pb - LEAD | Oc - OCHER |
| Au - GOLD | Op - OPTICAL CALCITE |
| Ag - SILVER | Sa - SALT |
| Zn - ZINC | Si - SILLIMANITE |
| Co - COAL | St - BUILDING STONE |
| Ch - CHERT | Tu - TURQUOISE |
| Cl - CLAY | ★ - GHOST TOWN |

Map 13.

Table 5

Major Mining Activity Prior to 1920¹

<u>Mining District</u>	<u>Materials Mined</u>
1 <u>Baldy</u> (Aztec, Baldy Mountain, Cimarron Copper Park, Eagle Nest, Maxwell's Mount Baldy, Old Baldy Mountains, Ute Creek, Virginia City, Willow Creek)	Gold, silver, copper, lead
2 <u>Cimarroncito</u> (Bonito, Cimarron Canyon, Urraca, Urraca Creek)	Gold silver, copper
3 <u>Elizabethtown</u> (Cimarron, Eaglenest, E-Town, Hematite, Iron Mountain, Moreno, Moreno Valley, Moreno Creek, West Moreno)	Gold, silver
4 <u>Mora</u>	Gold
5 <u>Rociada</u> (Hadley, San Carlos, Upper Rociada)	Copper, gold, lead, silver, zinc
6 <u>Abiquiu</u> (Cobre Basin, Cobre Canyon, Copper Canyon)	Copper
7 <u>Abiquiu Stone</u>	Building Stone (Sandstone & Tuff)
8 <u>Bromide No. 2</u> (Bromide, Headstone, Tusas Mountain)	Gold, silver, copper, lead, zinc
9 <u>Chama Placers</u> (Rio Chama Placers Region)	Gold
10 <u>Gallina</u> (Coyote, Gallina Prospect Region, Jarosa, Mesa Alta Mining Mountain, Youngsville)	Copper, silver, clay
11 <u>Hopewell</u> (Eureka, Good Hope, Headstone, Tres Piedras)	Gold, silver, lead, copper, zinc
12 <u>Ojo Caliente No. 1</u> (Ojo Caliente)	Mica
13 <u>Petaca</u> (Alamos, Cribbenville, La Madera, Las Tablas, Ojo Caliente, Paloma Canyon Prospect, Servilleta, Tres Piedras, Vallecitos)	Gold, silver, lead, copper
14 <u>Cochiti</u> (Albemarle, Bland, Peralta Canyon)	Gold, silver, lead,

15	<u>Hagan Coal</u> (Hagen, Una del Gato)	Coal
16	<u>Jemez Springs</u> (Jemas, Jemes, Jemez Mountain, Jemez Plateau, Jemez Pueblo, Spanish Queen)	Copper
17	<u>Nacimiento Mountains</u> (Copper City, Cuba, Fureka mine, Nacimiento, San Francesca, San Miguel, San Miguel mine, Senorita, Senorito, Sierra Nacimiento)	Copper, silver
18	<u>Placitas</u> (Algodones, Pernalillo, Capulin Peak, Juan Tabo, La Luz, La Luz mine, La Madera, Las Placitas, Montezuma, Nero Placers(?), Placitas-Montezuma, Sandia, Sandia Mountains, Sandia-North Manzano Prospect Region, Sandia No. 1)	Lead, copper
19	<u>Flk Mountain</u> (Bull Creek, Cow Creek, Flk Creek, Las Vegas, Rio de la Vaca)	Mica
20	<u>El Porvenir</u> (Permit Mountain, Mineral Hill, Porvenir)	Copper
21	<u>Tecolote</u> (Las Vegas, Las Vegas mines, Mineral Hill (?), Ribera, Ribera Copper Prospects, Rivera, Salitre, San Miguel, San Pablo, Selitre)	Copper
22	<u>Willow Creek</u> (Cooper, Cowles, Hamilton, Pecos, Pecos River, Tererro, Valley Ranch)	Zinc, lead, cooper, gold, silver
23	<u>Aspen Mountain</u> (Aspen Ranch)	Gold, silver, copper, lead, zinc
24	<u>Cerrillos</u> (Bonanza City, Carbonateville, Cerillos, Galisteo Creek, Hungry Gulch, Los Cerrillos, Los Cersillos, Mount Chalchihuitl, Turquesa, Turquoise (e), Turquoise City, Turquoise Hill)	Turquoise, zinc, lead, silver copper, gold, clay
25	<u>Cerrillos Coal Field</u>	Coal-anthracite and bituminous
26	<u>Glorieta</u> (Glorieta, Glorieta Mesa, Glorieta, Mailleuchet (?) Mesa)	Copper, mineral paint (ocher)
27	<u>Nambe</u> (Chimayo, Cordova, Santa Fe Mountains, Truchas)	Mica

- | | | |
|----|---|--|
| 28 | <u>New Placers</u>
(Alamillo, Carnahan, Golden, Golden Placers, Lazarus Gulch, Nero Placers (?), Placer Mountains, San Isidro (?), San Lazaro, San Lazarus Placers, San Pedro, San Pedro Mountain (s), Santa Fe, San Ysidro Mountains, San Zaro, Silver Butte (s), Tuerto Mountain (s), Tuertos Range) | Copper, silver, gold, |
| 29 | <u>Old Placers</u>
Cunningham Gulch, Dolores, El Real de Dolores, Lone Mountain, Ortiz, Ortiz Mountains, Rio Galisteo, San Lazaro (?), San Zaro (?), Sierra del Oro, Silver Butte (s) | Gold, copper |
| 30 | <u>Santa Fe</u>
(Dalton-Macho, Mailleuchet (?), Mikado, Montezuma, Penacho Peak Prospects, Santa Fe Mountains, Tencaho) | Copper, silver, gold clay, limestone |
| 31 | <u>Anchor</u>
(Keystone, La Belle, Midnight, Red River) | Gold |
| 32 | <u>Picuris</u>
(Copper Hill, Copper Mountain, Dixon, Glenwoody, Harding Mine, Hondo Canyon, Penasco, Picuris, Rinconada, West Picuris) | Copper, gold, silver, optical calcite, sillimanite |
| 33 | <u>Red River</u>
(Alum Gulch, Black Copper, Black Mountain, Lower Red River, Moly, Questa, Sulphur Gulch) | Gold, silver, copper |
| 34 | <u>Rio Colorado Placers</u>
(Colorado Creek) | Gold |
| 35 | <u>Rio Grande Valley</u>
(Rio Grande Placers) | Gold |
| 36 | <u>Twining</u>
(Amizette, Arroyo Hondo, Rio Hondo) | Copper |
| 37 | <u>Estancia Salt</u>
(Big Salt Lake, Laguna del Perro, Laguna Salina) | Salt |
| 38 | <u>Cerro Pedernal</u> | Chert |

Table 6	Ghost Towns	Post Office Founded ¹
<u>Colfax County</u>		
	Baldy	1888
	Elizabethtown	1868
	Virginia City	1868
<u>Sandoval County</u>		
	Albemarle	1901
	Allerton	1894
	Bland	1894
	Copper City	1883
	Coyote	1904
	Hagan	1902
	Senorito	1901
<u>Santa Fe County</u>		
	Bonanza City	1880
	Carbonateville	1879
	Cerrillos	1880
	Golden	1880
	La Bajada	1870
	Madrid	1896
	Real de Dolores	1887
	San Pedro	1881
<u>Taos County</u>		
	Amizette	1893
	La Belle	1895
	Midnight	1895
	Twining	1902

¹ from Sherman and Sherman 1975.

1835 was not more than \$80,000 per annum (cited in Northrop 1975:17). Various small scale mining operations were undertaken during the period of United States control of New Mexico but prior to the Civil War. It was not until 1867, as a result of the discovery of gold in the Moreno Valley that the first real "boom" in New Mexico mining occurred. In that same year, most of the creek bottoms on the west side of Baldy Mountain yielded gold and a rush ensued. The mining involved was hydraulic, and water supply was uncertain. Work on the "Big Ditch" was initiated in 1868; eventually the diversion channel was extended for 41 1/8 miles, diverting nearly 1,000 cubic feet per minute from the headwaters of the Red River. Three large lakes were constructed to serve as reservoirs along the ditch, with several smaller reservoirs on Baldy Mountain above the placers (Pettit 1966). The ditch and reservoirs are still observable and, as of 1966, some of the original flumes were still in place. Those creek bottoms which were the most

prominant producers were the Willow, Humbug, Grouse, Big Nigger and Pine. The Aztec mine was discovered in 1868, and Montezuma in 1869 (Pettit 1966). Poor management and the difficulty of maintaining the hydraulic systems led to an end of most activities between 1901 and 1904. A number of "boom" towns were founded, with Elizabethtown in Colfax County probably the most famous. Established in 1867, it had a population of 7,000 by 1868 and was the seat of Colfax County from 1870 to 1872; by the 1880's there were fewer than 400 residents (Pettit 1966). The better known ghost towns of the early mining period are indicated on Map 13.

RAILROADS

The mining boom, particularly in the Leadville area of Colorado and in the San Juan Basin, was important to the development of railroads in New Mexico. Various

companies fought legal battles to obtain rights for new rail lines to connect the mining areas with the east, and to extend rail transport facilities as far south as Mexico. There was a railroad war between the Santa Fe Railroad and the Rio Grande Railroad starting in the 1870's, culminating in open fighting at Raton Pass (Lyckman 1976:7). An agreement, known as the Boston Treaty of 1880, was reached in which the Union Pacific, Santa Fe and Rio Grande railroads divided access lines within the area (Map 14). As Lyckman (1976) points out, the narrow gauge lines were most useful in mountainous terrain, because they were cheaper to construct and could handle sharper turns than the standard gauge. The most important of the narrow gauge lines was the "Chili Line" from Alamosa, Colorado to Santa Fe, operated by the Rio Grande Railroad. Some of the stations along the line in New Mexico were Palmila, Volcano (opposite San Antonio Mountain), Skarda, No Agua, Tres Piedras, Servilleta, Caliente (Taos Junction), Barranca, and Embudo (Lyckman 1976).

LUMBERING PRIOR TO 1930

The railroads proved critical for lumbering operations that were numerous in the mountainous portions of the study area, Particularly between about 1905 and 1930. Timber was used by the railroad companies for ties and trestles and by the mining companies for props (Lyckman 1976, Kirkpatrick 1977). Access to timber was difficult, as was the transport of logs by horsedrawn carts. Therefore, miles of short narrow gauge rail lines were constructed into the mountains from major transport or processing centers. For example, timber was rough-cut at Ponil Park and Metcalf and transported on flatcars to the mill at Cimarron (Kirkpatrick 1977). Several lines were built from La Madera to Taos Junction. Lyckman (1976) describes the operation of the Santa Barbara Tie and Pole Company in southern Taos County. The company cut timber which was initially transported by horse to chutes or flumes which carried it down the mountain sides. A narrow gauge railroad moved the logs to the Penasco area, where a saw mill cut most of the lumber into ties. The ties were floated down available streams during high water to the Rio Grande, and then to

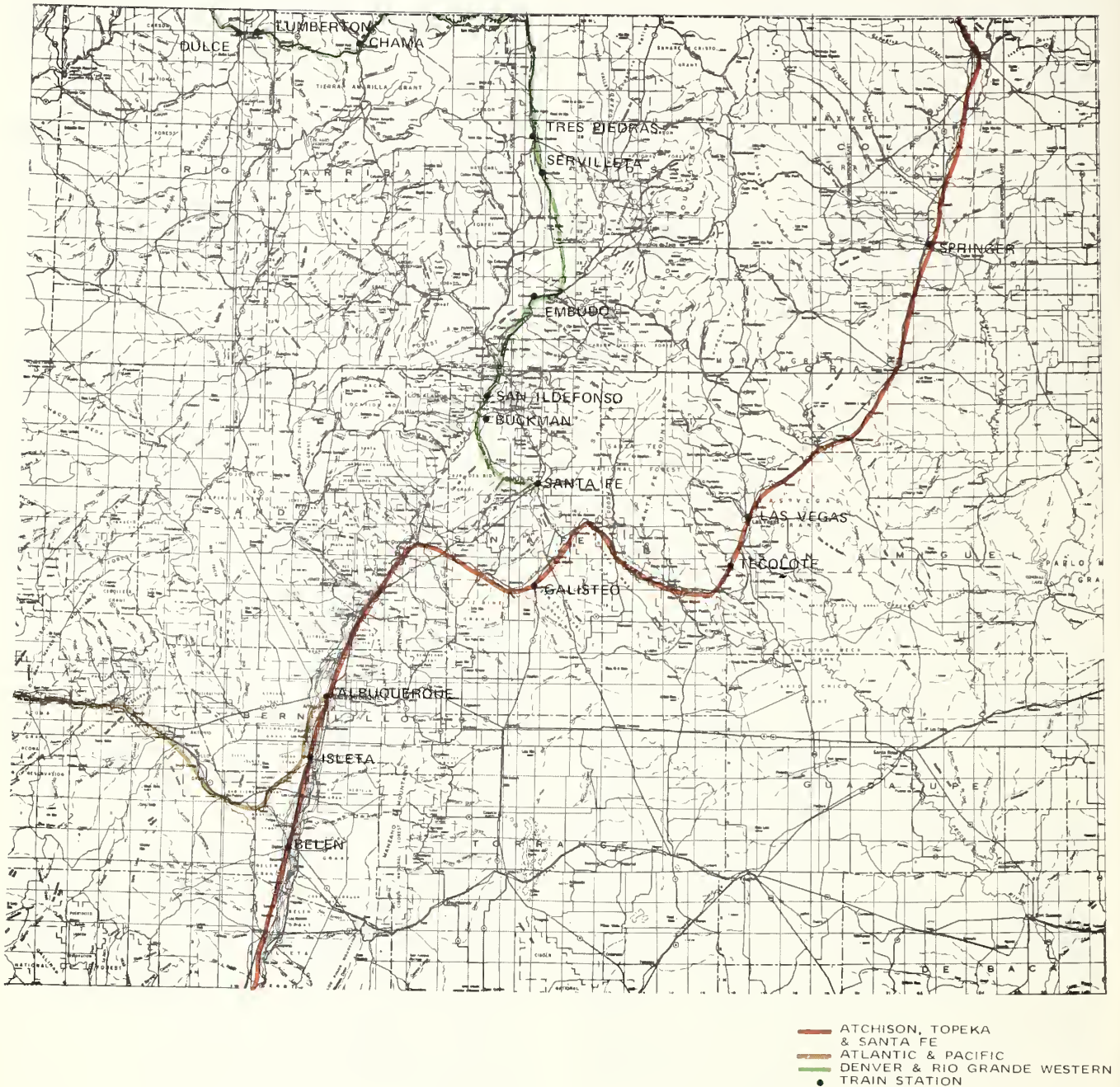
about the area of Cochiti Pueblo. There a standard gauge railroad was built to carry ties to the main line of the Santa Fe railroad which moved them to the treating plant in Albuquerque. Although the tracks of the narrow gauge railroads built for lumbering were removed in the 1930's and 1940's, the remains of small logging communities and company towns are still standing and provide a valuable source of information about the domestic activities and way of life of these communities (Kirkpatrick 1977).

Depending on the particular situation, timber cutting was carried out by families, independent contractors or the lumber companies. Some of the labor was specialized. For example, the production of mine props required special processing, whereas timber for ties was rough-cut prior to transport. Crews consisting of either one or two families or a few men would specialize in one of these two major types of production (Kirkpatrick 1977). Company records and other archival sources provide information which would permit analysis of the composition and structure of the work groups. These data, combined with archeological investigation of the timber camps and company towns, are a valuable resource for the generation and testing of hypotheses relating to the material correlates of different kinds of household composition and labor organization, and for documenting the technology of lumbering operations of the period.

ASSESSMENT OF THE HISTORIC PERIOD

The resources of the study area provide a unique opportunity for research relevant for contemporary questions in anthropological demography, human adaptation, social and political organization and understanding of the long-term effects of various patterns of land use. Historic documents span the period from 1540 to the present and contain information pertaining to the biological and cultural characteristics of the inhabitants, their settlement patterns, economic activities and social, political and religious organizations, as well as data on climate, flora and fauna. The documents, combined with the material remains of activities carried out by peoples of diverse ethnic affiliation, permit an

EARLY RAILROADS



Map 14.

understanding of the dynamic interrelationships among peoples and the natural environment over a period of more than 400 years. Yet, the potential of this research base has not been systematically or comprehensively explored.

Among the reasons for this neglect are the lack of archeological interest in sites which date to the historic period, the tiny number of archeologists trained in the use of archival data, the few institutions that employ interdisciplinary teams (including archivists, ethnohistorians, ethnologists, archeologists and physical scientists), and the emphasis on the remains of Indian communities and disregard for Hispanic and Anglo communities. The many historians who have conducted research in the study area have emphasized major "events" (such as the establishment of the first capital, the Pueblo Revolt, civil war battles, etc.) or the lives of famous persons (such as Kit Carson, Juan Francisco Martin or D. H. Lawrence) at the expense of studies of social history. The works of Swadesh (1974, 1978), Simmons (1969), Zubrow (1975) and Kirkpatrick (1977), indicate the

more promising holistic direction which might be taken. In addition, a combination of archeological, ethnohistorical and archival research would be valuable specifically to archeology in providing the development of methods for distinguishing unambiguously the cultural affiliation of groups from material remains. A combined approach would also provide an understanding of processes of site formation and the development of expected "visibility" and longevity estimates for the material remains of known activities. It would be valuable to ethnologists interested in differential acculturation rates reflected in material items, and in material culture items associated with various activities. Both archeologists and ethnologists are concerned with the spatial patterning of settlements and activities, and with developing and testing hypotheses to explain this observed patterning (Smith 1977, Gummerman 1971, 1972). Integrated research strategies which use the data of the historic period can contribute to the advancement of anthropology and social history as disciplines.

MANAGEMENT CONSIDERATIONS

GENERAL CONCERNS

Prior to developing effective and efficient management programs, cultural resource specialists must be able to estimate the number and kinds of resources in their area. Although the bulk of this report has provided the background for anticipating the resources in the study area, relatively little attention has been given to predicting the density of resources in specific locations. Generally, there are two approaches to site prediction in the current literature. The more common approach involves extrapolating predictive statements from known distributions, an art that is far better developed in parts of the Southwest outside the study area. Expectedly, attempts along this line have been made where modern energy resource exploration and mining are most intensive. The San Juan Basin is a particularly good example. Two apparently successful examples are those of Camilli and Seaman (1978) and of Stuart (1978). The first uses environmental stratification based on remote sensing imagery, and discriminated differences in the amount of vegetative cover and frequency of broken terrain, which indirectly monitor areas that receive different amounts of rainfall (Camilli and Seaman 1978:42). The second example derives from the observation that, within portions of the San Juan, site density appears to be a function of topographic characteristics which can be measured by mean contour intervals; exceptions occur where critical environmental variables such as distance to nearest watercourse condition the placement of Anasazi farming complexes (Stuart, 1978).

Within the study area predictive models for the density of artifacts have been explored in a preliminary manner in the Taos district (Morenon and Quinn 1977, Grady and Morenon 1977). In this case, differential distributions noted in one drainage were extrapolated to another drainage with moderate success. It is expected that both use and refinement of the extrapolation approach in the study area will increase by necessity as the geothermal, water and mineral resources of the middle Rio Grande become more important to the national economy. The advantages of

prediction by extrapolation are efficiency (cost effectiveness), and practicality (that is, they work) (Stuart, 1978). The disadvantage of the approach is that it does not necessarily lead to an understanding of the conditions that cause differential distributions of cultural resources nor does it contribute to the explanation of variability either in human behavior or in the archeological record (cf. Grady and Morenon 1977).

The second major approach to the prediction of site distributions and densities relies on developing general models of human behavior, particularly with respect to settlement patterns and land use. There are fewer examples of this type of approach in the archeological literature, and again those that do exist do not relate directly to the study area. Among the more productive of these are the investigation of human utilization of diverse plant communities during the Archaic (Allan, Osborn, Chasko and Stuart 1975), and work on the selection by prehistoric agriculturalists of particular topographic settings and proximity to specific vegetation zones (Zubrow 1971, Plog 1974a, 1974b, Plog, Hill and Read 1976, Cordell 1975). The primary disadvantages of these models are that they were not designed to be cost effective, and they vary considerably in accuracy. In the long run; however, because this approach is explicitly concerned with developing and testing hypotheses about human behavior, its explanatory potential is high, its goal is consistent with the general aims of anthropology as a discipline, and it should lead to the isolation of causal variables which, in turn, allow more precise prediction, but it must be remembered that the archeological record is a product of the interaction of human behavior and geological processes. In order for site prediction to become accurate, the interaction of both must be considered. I offer two examples of the directions that might be pursued, which have cautionary implications for archeology in general.

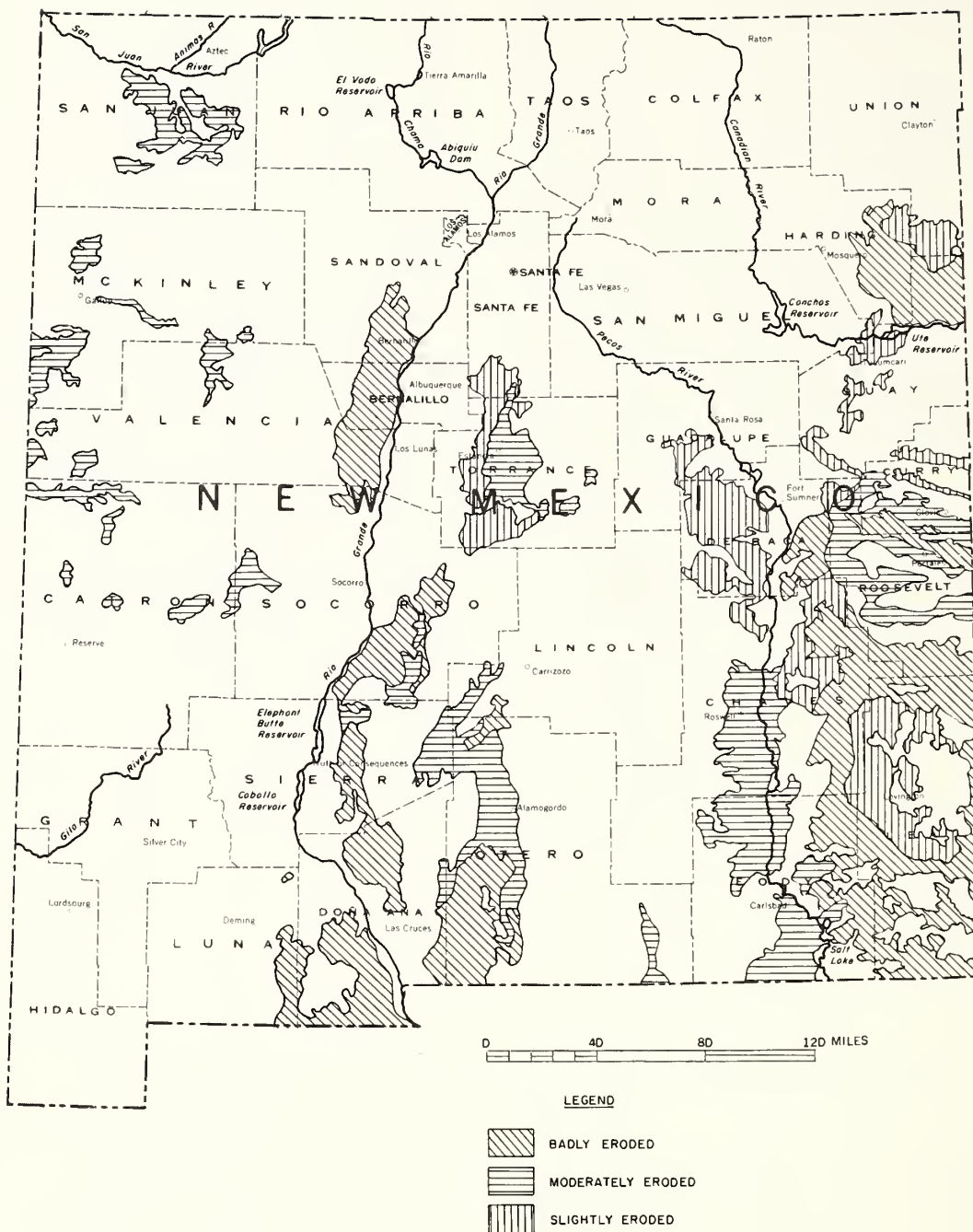
In reviewing the PaleoIndian data, the spotty distribution of sites is apparent immediately. Given the temporal depth involved, I have been troubled by behav-

ioral interpretations based on characteristics of the environmental settings in which these sites are found. It seemed to me that we might be looking at areas in which surfaces of the appropriate antiquity are exposed, rather than at geographic features which were selected as activity loci by PaleoIndian groups. In order to begin to investigate this possibility, Map 15 was prepared. Although the degree of detail on this map is not as precise as desirable, it indicates those areas of New Mexico in which erosion ranges from extreme to moderately severe. It should be noted that, with the exception of cave sites, all known PaleoIndian sites in New Mexico are located within the eroded areas. Further, it is unlikely that PaleoIndian sites will be found outside these areas. Thus, it may be suggested that the failure of the site pattern recognition approach in the Negeezi area (Oaks 1977) indicates only that the area is not eroded to a sufficient extent to expose PaleoIndian deposits. Behavioral statements about the preference of PaleoIndian hunters for particular landforms must be evaluated against the co-occurrence of landform types with patterns of erosion. Population estimates for the PaleoIndian period must consider the proportion of finds in relation to the eroded surfaces, and not to continental land mass. Whether the presence or absence of PaleoIndian sites in a particular area is of outstanding significance for behavioral interpretation must also consider the condition of the land surfaces. Specifically, soil maps of a finer scale which indicate eroded landforms and are available to National Forests and Bureau of Land Management district offices must be consulted.

Current research emphasis on defining and explaining the extent of prehistoric cultural systems combined with the management concerns of agencies which are responsible for relatively large areas of land have shifted the level of archeological interest from a focus on the single site to the distribution of both habitation and special use sites (and in some cases, isolated artifacts) on a regional basis. Although numerous recent studies have been concerned with the stratification of regions on the basis of potentially significant resources (vegetation zones, arable land, water sources, etc.), there has been little effort directed toward defining the geographic limits of any particular "cultural

system." (Wobst's 1977 work is a notable exception.) It occurred to me, as I am sure it has to others, that "system boundaries" will be conditioned, in part, by the relative productivity of specific areas. In order to examine the implications of this proposition more closely, Table 7 was prepared, based on recent land claims cases (Ellis 1974a, 1974c). Although land claims data may be suspect for a variety of reasons, in this case I think they provide an informative baseline. The Pueblos examined, Taos and Laguna, were selected because they occupy very different kinds of settings. Taos receives considerably more rainfall and is in an area of relatively more dense vegetation. It is also in close proximity to mountains which provide lithic source materials, game and other resources. Laguna, by contrast, is in a location which is drier, more sparsely vegetated and further from the resources of high elevations. Intuitively, it seemed likely that the support area necessary to sustain the population of Taos would be less than that necessary for Laguna. The land claims data were screened so that activities which were the result of European contact were eliminated. Thus, grazing areas, for example, were omitted. The anticipated contrast in distances travelled is revealed clearly by Table 7. Equally informative are the actual distances specified for each of the activities and the kinds of sites which should be anticipated both with respect to the activities being performed and the necessities of travel (such as overnight camps).

Table 7 is a "first approximation" which should be refined. It does suggest that careful consideration of site function must be accomplished before reasonable population estimates are derived, that data collection strategies among institutions should be coordinated so that the extent of sustaining areas for prehistoric groups eventually may be defined, and that the utility of lithic and sherd scatters for contributing to the delimitation of the extent of sustaining areas should be given attention. Specifically, determination of lithic sources, degree of lithic reduction, temper sources used in ceramics, variability in design elements and design execution in ceramics, as well as ethnographic studies of contexts of use, discard and loss of various classes of artifacts should be pursued. These kinds of analysis



AREAS OF SUBSTANTIAL EROSION

Map 15.

Table 7 Comparison of Distances Travelled from Taos and Laguna

Activity	Direction	Distance Travelled From Taos in Miles	Distance Travelled From Laguna in Miles
Hunting	N	-	-
	NE	12	-
	E	11	-
	SE	19	160
	S	10	65
	SW	11	120
	W	13	30
	NW	13	25
Total		89	400
Average		12.71	80
Collecting and Gathering	N	9	10
	NE	11	-
	E	12	-
	SE	14	-
	S	10	-
	SW	-	90
	W	9	75
	NW	11	16
Total		76	191
Average		10.86	47.75
Farming	N	5	-
	NE	-	10
	E	5	-
	SE	-	8
	S	5	25
	SW	7	9
	W	-	-
	NW	11	-
Total		33	52
Average		6.60	13
Other Activities (Shrine Visits)	N	18	16
	NE	11	-
	E	16	16
	SE	19	4
	S	9	-
	SW	14	90
	W	13	32
	NW	-	20
Total		100	178
Average		14.29	29.67

should be focused on very large geographic areas.

In general, I assume that inventorying of cultural resources on Federal lands will continue and that the current level of data

recording (as exemplified by the site and survey forms now in use by the USDA Forest Service in Region 3) will be sustained. There should be no doubt about the utility of this process. Cultural resource managers should use the computer

files currently available and continuously assess their utility and limitations. The preparation of this overview suggested that research and management concerns require considerably more integration of professional expertise as well as of data from areas larger than cultural districts; these objectives are appropriately pursued by land managing Federal agencies. Specifically, the talents of archeologists, ethnologists, historians, geographers, geologists and climatologists are needed to exploit fully the information potential of cultural resources.

The gaps in our current knowledge stem in part also from insufficient analysis of existing collection, which in some instances, may be more important than additional excavation. This seems to be particularly true of the Pueblo IV material. In any case, no future excavation should be undertaken without a comprehensive program, including a budget for analysis. There is an apparent need to determine the full range of variability for all time periods including documentation of settlement patterns on a regional basis, community patterns, architectural features and artifact classes. Finally, methods for deriving population estimates, again for all time periods, need to be developed in an integrated fashion.

SPECIFIC RECOMMENDATIONS

The suggestions listed below derive from the preceding narrative. Here they are stated briefly and without amplification. For this reason, page numbers are given after each statement that refer the reader to the appropriate sections of the text for relevant background.

1. Basic chronological data, derived independently of artifact types, are needed for the PaleoIndian and Archaic periods. pp. 13-17, pp. 25-28, pp. 32-33.
2. Chronological control, independent of artifact types, is necessary for an early all Rio Grande Black-on-white wares, especially early types such as Red Mesa-like and Kiatuthalana-like types. pp. 35, 39, 43, pp. 54-56, p. 58, pp. 102-104.
3. Re-evaluation of existing collections of locally manufactured Black-on-white wares should consider manufacturing technology, vessel size, temper sources, and design affiliations in addition to temporal position. p. 46, p. 49, pp. 55-50, p. 58, pp. 102-104.
4. Specific attention should be given to sites which may date between B.C. 2000 and A.D. 400. pp. 25-33.
5. The chronology of the Taos District needs refinement. pp. 34-41.
6. Paleoenvironmental reconstructions are needed for both the PaleoIndian and the Archaic. pp. 10-13, pp. 29-30.
7. Because PaleoIndian and Archaic deposits are frequently surficial and chemical and palynological data can be recovered, a non-collection survey strategy should be pursued. Alternatively, the collection of artifacts and materials which will be analyzed for paleoenvironmental data should be considered. p. 33.
8. Cave sites and eroded surfaces within the study area are areas of high potential for Archaic and PaleoIndian remains. The former may yield data of pre-Clovis antiquity. pp. 17-18.
9. Systematic examination of grassland-timber ecotones and mountain foothill areas for early PaleoIndian material is important for testing recent hypotheses about the adaptation of groups during this period. pp. 19-21.
10. Geological and paleoenvironmental studies of the Albuquerque District's eroded west mesa may be used to test models of Clovis subsistence. p. 21.
11. The study area is especially significant with respect to its potential contribution to understanding artifact variability during the Archaic. Therefore, typologies, paleoclimatic reconstructions and chronology developed for the Puerco should not be generalized to the study area, but independently investigated. pp. 24-28.
12. The lithic sites of the Taos and Chama areas should be evaluated along broad lines which should include determining whether their context of recovery is Archaic, Ute,

- part of an Anasazi subsistence pattern, or an Anasazi adaptation to hunting and gathering when agriculture was not possible or not efficient. pp. 106-108.
13. Refined paleoclimatological studies in the Taos and Chama areas should be combined with suggestion 12. pp. 48-50, pp. 67-101.
 14. Paleoenvironmental reconstruction and excavation on the western plains margin of the study area are important in relation to current models of Anasazi origins. pp. 28-33.
 15. Excavation in the Gallina District should include isolated pithouses. pp. 48-49.
 16. Excavation in the Gallina District should consider the degree to which there was an emphasis on hunting during all time periods and on interaction with other areas. pp. 49-50, pp. 100-101.
 17. The analysis of lithic tools has been neglected for sites of the Anasazi Period in all parts of the study area. p.64 , p. 135.
 18. Excavation on the Pajarito Plateau has been biased toward the larger and later sites. The amount of variability in the smaller, predominantly "Santa Fe," sites needs to be addressed. pp. 60-61, pp. 63-64.
 19. There has been neglect of 17th century domestic sites. pp. 115.
 20. Variability in domestic sites of both the 17th and 18th centuries has been insufficiently explored. p. 115.
 21. Photoarchives and aerial photography should be useful in monitoring the effects of agriculture and grazing on the landscape of the study area. p.118, p. 132.
 22. Ethnographic and historic data should be employed in order to develop models for determining "cultural affiliations" of prehistoric groups. pp. 104-105.
 23. Domestic sites of the Spanish Colonial and Mexican periods are important to test hypotheses relating settlement type to economic structure. pp. 118-119.
 24. Indian sites which date to the early historic period may provide useful information on differential acculturation rates. pp. 118-121.

With enlightened management policies and integrated long-term goals, the cultural resources of the study area will provide information which is of great value to anthropologists, historians, geographers and economists. The recreational value of these resources is enhanced by exploiting their scientific potential. In effect, they are tools of public education. The temporal depth provided by archeology may contribute significant information to land management itself. For example, it is possible to monitor floral succession rates under different climatic conditions and different conditions of land use when archeological data provide baselines. The long-term effects of grazing, mining and timber cutting within the study area are also amenable to analysis. It is my hope that future work in the study area will proceed toward these goals.

APPENDICES

I. LOCATIONS OF SOURCE DOCUMENTS AND FILES

This section lists and briefly categorizes the holdings of locations visited during the preparation of this report.

I. U.S.D.A. Forest Service, Southwestern Regional Office, Albuquerque

1. Clearance reports for all forests within the Region.
2. Preliminary and final reports on research activities carried out within the forests.
3. Publications of the Regional Office, such as the Archeological Report Series.
4. A small working library of major publications which contain data relevant to the archeology of the Region.
5. Computerized site and survey form files.
6. Aerial photographs and topographic maps of the Region.

II. U.S.D.I. Bureau of Land Management, Albuquerque Office

1. Clearance reports for all survey and excavation on BLM lands within the district.
2. Site forms and survey forms for recent work done on BLM holdings within the district.
3. Preliminary and final reports submitted by contracting institutions for work done on BLM lands.

III. Zimmerman Library, University of New Mexico, Albuquerque

1. Most publications relevant to Southwestern archeology and history, including major journals.
2. Both the Special Collections and Anderson Rooms contain complete runs of journals and some out of print publications. Special Collections also contains a map file.

IV. Clark Field Archive, Department of Anthropology, University of New Mexico, Albuquerque

1. Some general publications relevant to Southwestern archeology and ethnology.
2. Complete runs of the Southwestern Journal of Anthropology (now Journal of Anthropological Research).
3. Complete file of all unpublished masters thesis and doctoral dissertations produced by students in the department.
4. Indexed photo archive.
5. Nearly complete set of Bureau of American Ethnology publications.

V. Maxwell Museum of Anthropology, University of New Mexico

1. Collections of artifacts and original field notes for many sites within the study area.
2. Computerized listings of holdings of the museum.

VI. Laboratory of Anthropology, Museum of New Mexico, Santa Fe

1. An excellent working library of materials pertaining to archeology, ethnology and history of New Mexico.
2. Bound and indexed set of Museum Notes series, which contains excavation reports and reports of special analyses conducted as part of museum excavations.
3. The holdings of the Survey Room includes information on sites, filed by LA number and indexed by county. Some files contain complete site information and reference to final excavation reports; others contain unsorted, unedited excavation notes. Some files contain only indications of surficial material (ie. types of sherds found on the surface during survey).
4. Of particular interest is that the museum has Nelson's original survey notes of the Galisteo Basin and old photographs of many excavated and unexcavated sites.
5. Complete highway salvage reports with index.

6. Some artifact collections relevant to the study area.

VII. Fort Burgwin Research Center, Taos

1. An excellent, small working library on southwestern archeology, ethnology and history.
2. Preliminary and final reports of the survey and excavation activities carried out by Fort Burgwin.
3. Field notes and artifacts from excavations and surveys conducted by Fort Burgwin.
4. Masters theses and doctoral dissertations pertaining to the Taos area.

VIII. Kit Carson Memorial Foundation, Taos

1. Unsorted and uncatalogued holdings. Most of the artifactual material recovered by Helen Blumenschein is apparently in the collection.

IX. Office of Contract Archeology, University of New Mexico, Albuquerque

1. Small, indexed working library of southwestern archeology.
2. Reports of all excavation and survey carried out by the office.
3. Files of reports of other contracting agencies working in New Mexico.
4. Publications such as the Working Draft Series and the results of large mitigation programs such as the Cochiti Project.

X. Chaco Center, National Park Service, University of New Mexico, Albuquerque

1. Small working library of southwestern archeology.
2. Computerized bibliography of all documents, publications and papers relating to the Southwest.

XI. Carson National Forest, Taos

1. Clearance reports for work on the Forest.

2. Excellent soil and vegetation maps for most of the Districts of the Forest.

XII. School of American Research, Santa Fe

1. Publications, reports and collections which result from the contract program, with available index.
2. Some original field notes and archival data.

Other Sources of Information

Unfortunately, given the time for the preparation of this report, I did not visit other institutions where there is information on the study area. I was fortunate in being able to obtain some reports and documents by contacting individuals by telephone, and my own professional library was used extensively for both published and unpublished reports. Nevertheless, anyone working in the study area should be aware of the following:

1. Southwest Cultural Resource Center, National Park Service, Santa Fe.
2. Santa Fe Office, National Park Service.
3. Remote Sensing Laboratory, National Park Service, Chaco Center, University of New Mexico, Albuquerque.
4. Technical Applications Center, Albuquerque.
5. Harwood Foundation Library, University of New Mexico, Taos.
6. Contract Archeology Program, New Mexico State University, Las Cruces.
7. State Planning Office, Santa Fe.
8. Center for Anthropological Studies, Albuquerque.
9. New Mexico Historical Library (State Archives), Santa Fe.
10. Museum of Albuquerque.
11. Supervisor's Office, Santa Fe National Forest, Santa Fe.
12. Supervisor's Office, Cibola National Forest, Albuquerque.

II. PERSONNEL EMPLOYED ON THIS PROJECT

The Contracting Officer's representative for the Bureau of Land Management on this project was Leo L. Flynn, Santa Fe Office. Dr. Dee F. Green, Southwest Regional Office, USDA Forest Service served as coordinator for this project.

Julia Dougherty and Gwen Jarahian Young provided support in preparing graphics material during the earlier phases of my work. Julia Dougherty gathered much of the modern climatic information and prepared three of the maps in their initial form. Gwen Young compiled additional climatic data and prepared the initial map on eroded areas.

Ted Greer prepared all of the historic

maps in their initial form and was of inestimable help in this as well as in checking bibliographical references. Julia Dougherty, Gwen Young and Ted Greer were employed by the Forest Service on the work-study program while contributing to this project.

Manuscript typing was done by Donna Calkins, Recreation Staff Unit, Southwest Regional Office, Forest Service.

The manuscript was edited by Dr. Harry Basehart and myself. Dr. Basehart, emiritus Professor of Anthropology, University of New Mexico, was retained as a project consultant by the Forest Service.

All final maps were prepared under the direction of Bruce Bohannon, USDA Forest Service, Regional Office.

BIBLIOGRAPHY

INTRODUCTION

This bibliography is not definitive, nor is it meant to be. It should provide a good introduction to the literature available on the Middle Rio Grande Valley. Most of the references are annotated. Those which are not are either adequately described in the text or were used as supplementary sources. The annotations provide general relevance in terms of cultural districts. Thus an annotation such as "Taos, Carson National Forest" indicates that the source is important for the Taos District and therefore for the Carson National Forest. The annotation does not indicate that the report refers specifically to a site or sites located within the Forest or BLM boundaries. Since administratively the study area includes one BLM unit (Albuquerque District) but three National Forests (Carson, Cibola, Santa Fe) to save space only the latter are specifically referenced.

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This is the preliminary assessment of resources in the permanent pool of Cochiti Reservoir. The research approach is explicitly cultural-ecological in nature. There is an excellent summary of research done in the "study area" (larger than the permanent pool), data on the 103 sites located, and a discussion of utilization of the area by time period. Nearly all the sites in the permanent pool reflect short-term, possibly seasonal utilization of the area (from late Archaic on) though the structure of the sites differ (ie. camps, field houses, corrals). The sites therefore offer unusual research potential for examining the roles of these short-term seasonal sites in the general adaptive system. (Cochiti, Santa Fe National Forest.)

1977 Archeological Investigations in Cochiti Reservoir, New Mexico. Volume 1: A Survey of Regional Variability. Office of Contract Archeology, University of New Mexico, Albuquerque.

Much of this is repetitive of the 1975 volume, but this volume contains: site descriptions, minimal information on the 223 sites in the flood control pool, petrographic study by Warren and her comments on lithic source material, lists of edible plants by major zones by Drager and Loose which indicates that some zones have more edible plants than others; discussion of the fauna of the area with both average live

weights and estimated edible weights for mammals and avifauna; a good discussion on the stratification of land on the basis of agricultural potential, and an excellent summary of use of the area during the historic period. (Cochiti, Santa Fe National Forest.)

Binford, Lewis R.

1968 Post-Pleistocene Adaptations. Pp.313-342 in S. R. Binford and L. R. Binford, eds. New Perspectives in Archeology, Chicago: Aldine.

Bingler, Edward C.

1968 Geology and Mineral Resources of Rio Arriba County, New Mexico. Bulletin 91 State Bureau of Mines and Mineral Resources. New Mexico Institute of Mining and Technology, Campus Station, Socorro. Standard geological reference, includes brief history of mining activity from ca. 1865. (Taos, Chama, and Gallinas areas, Carson National Forest.)

Binkley, W. C.

1920 "The Question of Texan Jurisdiction in New Mexico Under the United States 1844-1850," Southwestern Historical Quarterly 23:1-38.

Blevins, Byron B. and Carol Joiner

1977 The Archeological Survey of Tijeras Canyon. In The 1975 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report No. 18. USDA Forest Service, Southwestern Regional Office, Albuquerque.

Results of the University of New Mexico survey of the Tijeras Canyon/South Sandia area. A discussion of the history of archeological work in the area is included as is a discussion of their formulation of "Ceramic Groups" and their temporal positions. (Albuquerque, Cibola National Forest.)

Bloom, Lansing B.

1913-15 "New Mexico Under Mexican

- Administration 1821-1846," Old Santa Fe 1: 131-75, 235-87, 346-68; 2: 3-56, 119-69, 223-77, 351-80.
- Blumenschein, Helen G.
 1956 Excavations in the Taos Area 1953-55. El Palacio 63:53-56. This is a brief report of survey and excavation undertaken by the Taos Archaeological Association. She mentions Association excavations at Site 1 (Pot Creek), and three pithouses. (Taos area, Carson National Forest.)
- 1958 Further Excavations and Surveys in the Taos Area. El Palacio 65:107-111. This report notes that the Taos Archaeological Association extended its survey north to Questa, east to Pot Creek, south to Penasco and Rinconada, and west to "about three miles" west of the Rio Grande Canyon. She notes 3 areas of pithouse concentrations: on the 50' ridge on the north side of the Hondo; on the 100' ridge paralleling Taos creek, and the 100' terrace above Pot Creek. Three pithouses in addition to those previously reported are discussed as is trenching in "unit-type" pueblos between Taos Pueblo and Talpa. (Taos area, Carson National Forest.)
- 1968 Historic Roads and Trails to Taos. El Palacio 75(1):9-19. Useful locational information is provided. (Taos area, Carson National Forest.)
- Boden, Paul
 1974 Soils of New Mexico, New Mexico State University Agricultural Experiment Station, Research Report 285, Las Cruces. Data used to compile map of eroded landforms.
- Bodine, John J.
 1972 Acculturation Processes and Population Dynamics, pp. 257-288 in Alfonso A. Ortiz, ed, New Perspectives on the Pueblos, School of American Research Book, Albuquerque, University of New Mexico Press.
- Bogan, Samuel D.
 1946 Let the Coyotes Howl: A Story of Philmont Scout Ranch, New York: G. P. Putnam's Sons. Descriptive site report. (Taos and Cimarron areas. Carson National Forest.)
- Bohrer, Vorsila L.
 1962 Ethnobotanical Materials from Tonto National Monument, Arizona. Pp. 75-114 in Archeological Studies at Tonto National Monument Arizona, by Charlie R. Steen, Floyd M. Pierson, Vorsila L. Bohrer and Kate Peck Kent. Louis R. Caywood, ed. Southwestern Monuments Association, Technical Series 2. Globe. (General overview, pertaining to ethnobotany.)
- 1970 Ethnobotanical Aspects of Snaketown, a Hohokam Village in Southern Arizona, American Antiquity 35:413-430. (General overview, pertaining to botany.)
- 1971 Paleoecology of Snaketown. The Kiva 36:11-19. (General overview, pertaining to botany.)
- 1973 Ethnobotany of Point of Pines Ruin, Arizona W:10:50. Economic Botany 35:423-437. (General overview, pertaining to ethnobotany.)
- Bohrer, Vorsila L., Hugh C. Cutler, and Jonathan D. Sauer
 1969 Carbonized Plant Remains from Two Hohokam Sites, Arizona BB:13:41 and BB:13:50. The Kiva 35:1-10. (General overview, pertaining to ethnobotany.)
- Bolton, Herbert E. editor
 1916 Spanish Exploration in the Southwest, 1542-1706, New York: Scribner's Sons.
- Bolton, Herbert E.
 1950 Pageant in the Wilderness, Utah Historical Society, Salt Lake City, (reprint).

Work of general historical interest.

Boserup, Ester

- 1965 The Conditions of Agricultural Growth, Chicago: Aldine Publishing Company.
Relevant to the assessment sections of both PaleoIndian and Archaic. Boserup's model involves viewing population as the independent variable in agricultural intensification. Her view has had considerable recent impact on archeological thinking.

Bousman, C. Britt, Paul Larson, and Frances Levine

- 1974 Archaeological Assessment of Bandelier National Monument. Archaeological Research Programs. Southern Methodist University, Dallas.
This report is primarily an annotated bibliography and a very good one. (Pajarito Plateau, Santa Fe National Forest.)

Bradfield, Maitland

- 1971 The Changing Pattern of Hopi Agriculture, Royal Anthropological Institute of Great Britain and Ireland, Occasional Paper 30. Excellent account of field selection and agricultural technology. (General overview.)

Bradley, Zorro A.

- 1971 Site Bc236, Chaco Canyon National Monument, New Mexico, Washington: National Park Service, Division of Archeology.

Braidwood, Robert J. and G. R. Willey, editors

- 1962 Courses Toward Urban Life, New York: Wenner-Gren Foundation for Anthropological Research, Inc.

Breternitz, David A.

- 1966 An Appraisal of Tree-Ring Dated Pottery in the Southwest. Anthropological Papers of the University of Arizona 10. University of Arizona Press, Tucson. Standard reference on chronology of ceramic types. (General overview.)

Brew, J. O.

- 1946 Archaeology of Alkali Ridge,

Southeastern Utah. Papers of Peabody Museum, Harvard University 21. Cambridge.

Brew raises a number of issues in this classic work; the meaning attributed to ceramic types, diversity of architectural styles, room/kiva ratios, etc.

Brody, J. J.

- 1968 Archaeological Studies in the Taos Area. (Ms. on file USDA Forest Service, Southwestern Regional Office, Albuquerque.) Notes for a talk given to the Albuquerque Archeological Society. This is an overview of his University of New Mexico field school work. He discusses the need to define the marginal Anasazi in themselves and not in relation to the San Juan. He notes that sites in the marginal area indicate a population as dense as Chaco, but (he thinks) they remained hunters and gatherers until ca. A.D. 800 when there was a dramatic shift to agriculture. (Taos area, Carson National Forest.)

Brody, J. J. and J. Lindsey

- 1955 Report on Excavation at Bg 92 (Ms. on file, Department of Anthropology, University of New Mexico, Albuquerque). Excavation report of work on Rattlesnake Ridge. (Gallina Cultural District, Santa Fe National Forest.)

Broilo, Frank

- 1971 An Investigation of Surface Collected Clovis, Folsom, and Midland Projectile Points from Blackwater Draw and Adjacent Localities. (Unpublished Master's Thesis, Department of Anthropology, Eastern New Mexico University, Portales.) (General overview, pertaining to PaleoIndian.)

Brown, Carolyn and Jane Robersshaw

- 1973 Casitas: A Plaza of the El Rito Valley, (Ms. on file, Colorado College). Paper done as part of the Colorado College ethnohistory project. Ground checking of possible locations for the Casitas

- community refers to several sites on the Carson National Forest. (Chama District, Carson National Forest.)
- Brown, W. E.
1963 The Santa Fe Trail National Survey of Historic Sites and Buildings, U. S. National Park Service.
- Brugge, David M.
1963 Navajo Pottery and Ethnohistory, Navajo-Land Publications, Series 2, Navajo Tribal Museum, Window Rock.
Report provides a detailed, cogent treatment of Navajo ceramics and their dating.
- 1965 Navajo Use of Agave The Kiva 31(2):88-98.
Brugge notes that both Eastern and Western Navajo occasionally used agave and that their agave technology had some unique traits. Importantly, the Navajo used rocks (either in or out of pits) for roasting, so before assuming that the presence of fire cracked rock is a clear sign of the Archaic, the presence of agave should be noted.
(General overview.)
- Bryan, Alan L.
1965 Paleo-American Prehistory. Occasional Papers of the Idaho State University Museum 16. Pocatello.
(General overview, pertaining to PaleoIndian.)
- Bryan, Kirk
1929 Flood-water Farming. Geographical Review 19:444-56.
Standard reference on agricultural technology of dry farming in the Southwest.
(General overview.)
- 1939 Stone Cultures Near Cerro Pedernal and Their Geological Antiquity. Bulletin of the Texas Archeological and Paleontological Society 2:9-42. (Taos area, Carson National Forest.)
- Bryan, K. and J. H. Toulouse, Jr.
1943 The San Jose Non-Ceramic Culture and its Relation to Puebloan Culture in New Mexico, American Antiquity 8(3): 269-290.
Discussion of San Jose Points, now considered Late Archaic.
- Bullard, William Rotch, Jr.
1962 The Cerro Colorado Site and Pithouse Architecture in the Southwestern United States Prior to A.D. 900. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University XLIV (2). Cambridge.
This is a report of two large pithouse villages near Quemado. Additionally, the report provides a synthesis of all excavated pithouses in the Northern Rio Grande Area up to ca. 1960. His review fails to substantiate the notion that any of the phases of the Mogollon or Hohokam (with the possible exception of the Hilltop Phase) are demonstrably older than the Basketmaker III of the Anasazi.
(General overview.)
- Burma, John H.
1949 "The Present Status of the Spanish-Americans of New Mexico," Social Forces 28:133-38.
General discussion.
- Bussey, Stanley D.
1963 The Llaves Site: Salvage Excavations at LA 5859, Laboratory of Anthropology Notes No. 23, Museum of New Mexico, Santa Fe. (Gallina Cultural District, Santa Fe National Forest.)
- 1964 The Llaves Pipeline Salvage Project-Preliminary Report. Laboratory of Anthropology Notes. No. 32. Museum of New Mexico, Santa Fe. (Gallina Cultural District, Santa Fe National Forest.)
- Campbell, John Martin and Florence Hawley Ellis
1952 "The Atrisco Sites: Cochise Manifestations in the Middle Rio Grande Valley," American Antiquity 17(3):211-21.
(General overview related to the Archaic.)
- Camilli, Eileen and Tim Seaman
1978 The Crownpoint to Bisti Water

Pipeline: Cultural Resource Management with the Aid of Remote Sensing. An Assessment of Cultural Resources for Public Service Company of New Mexico (Ms. on file, Public Service Company of New Mexico). Discussion of a predictive model for determining site densities in the San Juan Basin, based on previous survey data and stratification of the Project area on the basis of LANDSAT imagery.

Carlson, Roy

1965 Eighteenth Century Navajo Fortresses of the Gobernador District, the Earl Morris Papers, No. 2, Series in Anthropology No. 10, University of Colorado.

Carneiro, Robert L.

1967 On the Relationship Between Size of Population and Complexity of Social Organization, Southwestern Journal of Anthropology 23: 234-243.

Castetter, Edward F.

1935 Uncultivated Native Plants Used As Sources of Food, University of New Mexico, Biological Series 4(1). Albuquerque. (General overview, pertaining to ethnobotany.)

Castetter, Edward and Willis M. Bell

1942 Pima and Papago Indian Agriculture. University of New Mexico Press, Albuquerque. (General overview, pertaining to ethnobotany.)

Castetter, Edward and M. E. Opler

1936 The Ethnobiology of the Chiricahua and Mescalero Apache. Ethnobiological Studies in the American Southwest, University of New Mexico Bulletin 297, Biological Series 4(5). Albuquerque. (General overview, pertaining to ethnobotany.)

Castetter, Edward and Ruth M. Underhill

1935 The Ethnobiology of the Papago Indians, Ethnobiological Studies in the American Southwest, University of New Mexico Bulletin 275, Biological Series 4(3). Albuquerque. (General overview, pertaining to ethnobotany.)

Cattle, Dorothy J., Charles H. Carroll and David E. Stuart

1977 An Ethnographic and Ethnohistorical Investigation of Eight Historic Laguna Archeological Sites within the Anaconda Company's P-15/P-17 and Dames and Moore Acreages: The Jackpile Mine, Pagate, New Mexico. (Ms. on file, Office of Contract Archeology, University of New Mexico, Albuquerque.) Report contains an excellent discussion of the reasons for using an ethnographic and ethnohistorical approach for mitigation of impact on historic sheep camps. In addition, land use patterns, and locations of sheep camps are discussed, and Laguna and Jicarilla sheepherding activities are compared. (Albuquerque, Cibola National Forest.)

Caywood, Louis R.

1966 Excavations at Rainbow House, Bandelier National Monument, National Park Service Southwest Archeological Center. Globe. This report contains a good historical sketch of work done in Bandelier. It summarizes and integrates the work Worman's field school did at Rainbow House (LA 217) with the NPS work there. Treering dates for Rainbow House and some of the other monument ruins are given. (Pajarito Plateau, Santa Fe National Forest.)

Chapman, Richard C. and Jan V. Biella

1977 Archeological Investigations of Cochiti Reservoir, New Mexico. Vol. 2: Excavation and Analysis 1975 Season. University of New Mexico, Department of Anthropology, Office of Contract Archeology. Albuquerque. This volume contains an explanation of the sampling strategy. Sites were first stratified by time period, then by "type" within each time period and a sample of at least 30 percent of each class excavated entirely. The report also contains the following specific discussions: ceramic types found, general problems in Upper Rio Grande prehistory, the results of analysis of lithic wear experiments, the use of Z scores to define intrasite activity areas based on

- artifact distributions rather than architecture; and a discussion of temper shifts in Rio Grande Glaze ceramics found in the area. (Cochiti, Santa Fe National Forest.)
- Chase, C. A. and Douglas Muir
1923 The Aztec Mine, Baldy New Mexico, American Institute of Min. Met. Trans. 68:270-281.
Mining history.
- Chavez, Fray Angelico
1954a Origins of New Mexico Families, Historical Society of New Mexico, Santa Fe.
Historical treatment of the roots of culturally Hispanic New Mexicans.
- 1954b "The Penitentes of New Mexico," New Mexico Historical Review 29:97-123.
Brief introduction to Penitente communities.
- 1974 My Penitente Land: Reflections on Spanish New Mexico, University of New Mexico Press, Albuquerque. Generally sociological and historical approach.
- Chenoweth, William L.
1974 Uranium Occurrences of the Nacimiento-Jemez Region, Sandoval and Rio Arriba Counties, New Mexico. Pp. 309-313 in New Mexico Geological Society Guidebook, 25th Field Conference, Ghost Ranch. Charles T. Siemers, ed.
- Although not extensive, there are uranium deposits within the study area; the generalized geologic map provided in this report locates these. (Chama area and Pajarito Plateau, Carson and Santa Fe National Forests.)
- Christiansen, Paige W. and Frank E. Kottowski, eds.
1963 New Mexico, a Mosaic of Science and History, Socorro: State Bureau of Mines and Mineral Resources.
- Colton, Harold S.
1955 Pottery Types of the Southwest.
- Museum of Northern Arizona Ceramic Series 3. Northern Arizona Society of Science and Art, Flagstaff.
Standard reference manual. Provides type descriptions. (General overview.)
- 1960 Black Sand, Albuquerque: The University of New Mexico Press.
- Colton, Ray C.
1959 The Civil War in the Western Territories, Norman: University of Oklahoma Press.
- Cook, H. S.
1927 New Geological and Paleontological Evidence Bearing on the Antiquity of Mankind in America, Natural History 27:240-247.
Discussion of the Folsom type site.
- Cope, E. D.
1879 Report on the Remains of Population Observed in Northwestern New Mexico, United States. Report Upon United States Geographical Survey West of the 100th Meridian. Vol. VII, Engineers Department of the U.S. Army, Washington, D.C.
First published account that includes description of archeological remains in the Gallina Cultural District. (Gallina area, Santa Fe National Forest.)
- Cordell, Linda S.
1972 Settlement Pattern Changes at Wetherill Mesa, Colorado: A Test Case for Computer Simulation in Archeology. (Unpublished Ph.D. Dissertation, University of California, Santa Barbara.)
- 1975 The 1974 Excavations of Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report No. 5 USDA Forest Service, Southwestern Region, Albuquerque. (Albuquerque, Cibola National Forest.)
- 1976 The Folsom Site in Retrospect. Pp. 83-86 in New Mexico Geological Society Guidebook, 27th Field Conference, Vermejo Park, Rodney

- C. Ewing and Barry Kues eds.
(General overview, pertaining to PaleoIndian.)
- 1977a Late Anasazi Farming and Hunting Strategies. One Example of a Problem in Congruence. American Antiquity 42(3):449-461.
Discusses site distribution in Tijeras Canyon with reference to excavated material from LA581 in order to delimit the range of resources utilized and possible farming technologies.
(Albuquerque, Cibola National Forest.)
- 1977b Report of the 1976 Season at Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report No. 18. USDA Forest Service, Southwestern Regional Office, Albuquerque.
Final field report of University of New Mexico excavations at LA581. Includes tree-ring dates and summary ceramic analysis, as well as survey results. (Albuquerque, Cibola National Forest.)
- Crane, H. R.
1955 Antiquity of the Sandia Culture: Carbon 14 Measurements. Science 122:689-690.
(PaleoIndian.)
- 1956 University of Michigan Radiocarbon Dates I. Science 124:66-672.
(PaleoIndian.)
- Cully, Anne C.
1977 Paleoclimatic Variability in the North-Middle Rio Grande, New Mexico. Pp. 91-104 in Archeological Investigations in Cochiti Reservoir, New Mexico Vol. I. Survey of Regional Variability. Jan V. Biella and Richard C. Chapman, eds. University of New Mexico, Office of Contract Archeology, Albuquerque.
Background correlation of geological and palynological reconstructions relevant to the White Rock Canyon area and the Rio Grande in general. Presents, in a concise fashion work already done. No new work reported.
(General overview, pertaining to paleoclimatology.)
- Cultural Properties Review Committee
1971 Historic Preservation A Plan for New Mexico, New Mexico State Planning Office, Santa Fe.
This volume provides inventories of historic properties by county and by theme and specific short-range and long-range programs as well as general recommendations for necessary legislation.
(General overview, pertaining to Historic sites.)
- 1973a The Historic Preservation Program for New Mexico. New Mexico State Planning Office, Santa Fe.
This volume provides an excellent, brief, history of New Mexico and the history, philosophy, problems solutions and organizations involved in the development of the State Historic Preservation Program for New Mexico.
(General overview, pertaining to Historic sites.)
- 1973b The Historic Preservation Program for New Mexico, Volume II The Inventory, New Mexico State Planning Office, Santa Fe.
This volume provides a summary of themes used in the preparation of the inventory of cultural properties and an inventory of properties by theme and by county.
(General over-view, pertaining to Historic sites.)
- Current Research
1970 Current Research in the Southwest: New Mexico. American Antiquity 35(4):510.
(General overview, pertaining to PaleoIndian.)
- Dart, Al
1977 The Santa Fe Community Development Historic Project: Survey and Monitoring for Cultural Resources (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe).
Report provides a list of sites (and sherd scatters) within the City of Santa Fe.
- Davis, E. L.
1965 Small Pressures and Cultural Drift

as Explanations for Abandonment of the San Juan Area, New Mexico. American Antiquity 30(3):353-355.

pp. 108-117 in Contemporary Archaeology, edited by Mark P. Leone. Carbondale: Southern Illinois University Press.

Davis, Irvine

1959 Linguistic Clues to Northern Rio Grande Prehistory. El Palacio 66:73-84.

Using glottochronology, Davis suggests that about 600 years has elapsed since there was a unified Tiwa language. This article is important because it is often cited in discussions of Taos area chronology. (Taos area and general overview, Carson and Santa Fe National Forests.)

Dawson, Jerry and W. James Judge

1969 Paleo-Indian Sites and Topography in the Middle Rio Grande Valley of New Mexico. Plains Anthropologist 14(44 part I): 149-163.

In addition to a general discussion of the survey, the report contains description of the Correo, Rio Rancho and Los Lunas sites. (General overview - PaleoIndian and Albuquerque areas.)

Dean, Jeffrey S.

1970 Aspects of Tsegi Phase Social Organization: a Trial Reconstruction. Pp. 140-174 in Reconstructing Prehistoric Pueblo Societies, William A. Longacre, ed. School of American Research Advanced Seminar Series, Albuquerque: University of New Mexico Press.

Cited for comparative purposes in the Anasazi assessment section.

Dean, Jeffrey S. and William J. Robinson

1977 Dendroclimatic Variability in the American Southwest A.D. 680 to 1970, Appendix 2. (Final Report to the National Park Service, Department of Interior. Project Southwest Paleoclimate. Tucson: Laboratory of Tree-Ring Research, University of Arizona.)

Comprehensive graphic presentation of deviations from average tree-ring widths from selected stations throughout the Southwest.

Deetz, James F.

1972 Archaeology as a Social Science,

Dick, Herbert W.

1965a Bat Cave. School of American Research, Monograph 27. Santa Fe.

(General overview.)

1965b Picuris Pueblo Excavations. No. PB-177047. Springfield, Va., Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, National Bureau of Standards, Institute for Applied Technology.

Report is critical both for the prehistory of Picuris and the early Apache groups in the area. Discusses the excavation of Old Picuris. (Taos Area, Carson National Forest.)

1975 Preliminary Report on the Site Survey on Mesa Golondrina. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque).

Most of the information in this report is more fully covered in Smith and Dick 1977. It should be noted though that a total of 59 sites were recorded and a map is provided, although the size of the site markers on the map makes interpretation of their locations very difficult. (Gallina area, Santa Fe National Forest.)

1976 Archeological Excavations in the Llaves Area, Santa Fe National Forest New Mexico, 1972-1974. Part I - Architecture. Archeological Report No. 13. USDA Forest Service, Southwestern Region, Albuquerque. This report contains preliminary information on the excavation of 8 surface houses and 5 pit houses (most are on Huerfano Mesa) and some information about Dick's surveys in the Llaves area. His orientation is to explain the mixture of surface structures and pithouses and why they were burned. He suggests that the "unique" Gallina single unit house

type may relate to horticultural practices. He notes that although pithouses outnumbered surface houses (by a factor of 5 to 1) located in his survey, almost all excavation has concentrated on unit houses. (Gallina area, Santa Fe National Forest.)

n.d.a An Archeological Survey of the San Pedro Parks Proposed Wilderness Addition (New Study Area #62), Santa Fe National Forest, Cuba Ranger District. Preliminary Report. (Ms. on file USDA Forest Service, Southwestern Regional Office, Albuquerque.) The area surveyed is very rugged and no attempt was made to cover it entirely, but the more or less flat areas were surveyed. The only finds were 3 projectile points at elevation of 7,900 feet, and 8,440 feet. (Gallina Area, Santa Fe National Forest.)

n.d.b Preliminary Report of the 1975 Excavations on Huerfano Mesa in Llaves Area, Santa Fe National Forest, New Mexico. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.) Three structures were discovered in 1975: a rock alignment that may serve as a water break, and two pits, perhaps serving as isolated storage structures. The report also contains a discussion of a tunnel connecting a burned pithouse with an unburned surface room and the possible prehistoric dam near Capulin creek. (Gallina Area, Santa Fe National Forest.)

Dickson, Bruce D.

1975 Settlement Pattern Stability and Change in the Middle Northern Rio Grande Region, New Mexico. American Antiquity 40:159-171. Dickson draws on material from the Deh Luran Plain (Iran) to develop an "hypothesis" that settlement in the Santa Fe area would show that agriculturalists first used piedmont land where rainfall is adequate for agriculture and then shifted to the river for irrigation. He falsifies this "hypothesis" with survey data.

He does demonstrate that settlement proceeded from more optimal to more marginal zones (although he does not use "biomass" to measure marginality), and that abandonment more or less followed the pattern in reverse order. He discusses his "site weight index" which is a good attempt to measure population size (relatively) given phases of different durations.

(Santa Fe, Santa Fe National Forest.)

1976 Proposal-Pueblo Settlement Pattern Stability and Change in the Rio Chama District, New Mexico: A Test of Some Hypotheses Using Archeological Surface. (Ms. on file USDA Forest Service, Southwestern Regional Office, Albuquerque.)

This proposal is for survey work in the Chama to test his "model" of settlement expansion and contractions developed in the Arroyo Hondo Project. He also proposes to refine techniques for defining natural districts using computers but the techniques are not specified. His third objective is to assemble a systematic body of data for the area following SARG. (Actually, this work as proposed was never carried out due to various difficulties explained in Dickson's 1977 letter/report to the Regional Office.) (Chama Area, Santa Fe National Forest.)

Di Peso, Charles C.

1974 Casas Grandes, A Fallen Trade Center of the Gran Chichimeca, Amerind Foundation Series, No. 9, Flagstaff.

Dittert, Alfred E. Jr.

1968 Some Factors Affecting Southwestern Populations During the Period A.D. 900-1540. Pp. 14-16 Contributions to Southwestern Prehistory, VII INQUA. Cynthia Irwin-Williams, ed. Boulder and Denver: Eastern New Mexico University.

A brief narrative of evidence of climatic change postulated for the period.

(General overview.)

Dominguez, Fray Francisco,
translated by Eleanor Adams and Fray
Angelico Chavez

1956 The Missions of New Mexico,
1776, Albuquerque: University of
New Mexico Press.

(General reference for historic
missions.)

Douglass, Andrew E.

1929 The Secret of the Southwest
Solved by Talkative Tree-Rings,
The National Geographic Magazine,
56(2):736-770.

Douglass, W. B.

1917 Land of the Small House People.
El Palacio 4(2):3-23.
Early descriptive account of
Gallina Phase remains. (Santa Fe
National Forest.)

Dozier, Edward P.

1954 The Hopi-Tewa of Arizona,
University of California
Publications in American
Archaeology and Ethnology 44,
no. 3. Berkeley.

1961 Rio Grande Pueblos, In
Perspectives in American Indian
Culture Change, Edward Spicer,
editor, University of Chicago
Press, Chicago.

1969 Peasant Culture & Urbanization:
Mexican Americans in the South-
west, pp. 140-158 in Philip K.
Bock, ed. Peasants in the Modern
World, Albuquerque: University
of New Mexico Press.

1970 The Pueblo Indians of North
America, New York: Holt,
Rinehart, and Winston, Inc.
Excellent introduction to the
modern Pueblos and Pueblo ethno-
graphy. The book also contains
an appraisal of Indian-Hispanic-
Anglo interactions.

Drager, Dwight and Richard W. Loose

1977 An Ecological Stratification of
Southern Pajarito Plateau, pp.
31-39 in Jan V. Biella and Richard
C. Chapman eds., Archeological
Investigations in Cochiti Reservoir,
New Mexico: Volume I: A Survey

of Regional Variability
Albuquerque: University of New
Mexico, Department of Anthro-
pology, Office of Contract
Archeology.

Remote sensing data were used to
stratify the area into zones.
Report also contains lists of
edible plants per zone. (Cochiti,
Santa Fe National Forest.)

Duncan, Rosalind

1971 The "Cochise Culture:" Analysis
and Explanation of Archeological
Remains, (Unpublished M.A.
Thesis, Department of Anthro-
pology, University of California,
Los Angeles).

(General overview, relevant to
both PaleoIndian and Archaic.)

Dutton, Bertha P.

1976 Navahos and Apaches: the
Athabaskan Peoples Indians of the
American Southwest, Englewood
Cliffs, New Jersey: Prentice-
Hall, Inc.

This volume provides a good
introductory overview of the
Southwestern Athabascans.

Eddy, Frank W.

1966 Prehistory in the Navajo Reservoir
District-Northwestern New Mexico,
Part I and II. Museum of New
Mexico Papers in Anthropology
No. 15, Santa Fe: Museum of New
Mexico.

Although outside the study area,
the Navajo Reservoir project
reports contain significant infor-
mation on the chronology and
settlement patterns of early
Anasazi.

(General overview.)

Eighmy, Jeffrey L.

1978 Archeomagnetic Sample Lab
Report (Ms. on file, Fort Burgwin
Research Center, Taos.)

Ellis, Florence H.

1964a "Archaeological History of Nambe
Pueblo, 14th Century to the
Present," American Antiquity
30:34-42.

1964b A Reconstruction of the Basic
Jemez Pattern of Social Organiza-
tion, with Comparisons to other

- 1964c Comments on Jett's "Pueblo Indian Migrations." American Antiquity 30(2):213-215.
- 1967 Where Did the Pueblo People Come From? El Palacio 74(3): 35-41.
 (General overview, pertaining to ethnohistory.)
- 1974a Anthropological Data Pertaining to the Taos Land Claim, In American Indian Ethnohistory, Vol. I. Indians of the Southwest. Pp. 29-150 in David Agee Horr, compiler and editor. New York and London: Garland Publishing Company, Inc.
 Report contains a summary of Ellis' archeological reconnaissance of the Taos area, her work with Brody on Taos cornfield and Taos trashmound, and interviews with the Taos elders on land utilization in the Taos region. (Taos area, Carson National Forest.)
- 1974b Summary Report of Ghost Ranch Field Work. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque). Reports work at LA 10643 and LA 10644 near Dulce Spring (site maps included). LA 10643 consists of several "nest-like" basins and "crevice caves." Ceramics consist primarily of Gallina Plainware and one or two Gallina Black-on-whites. LA 10644 is at an elevation of 10,000 feet, comprises five circular pithouses, three of which were excavated. These contained no pottery or fireplaces. (Gallina area, Santa Fe National Forest.)
- 1974c Anthropology of Laguna Pueblo Land Claims, V. III American Indians of the Southwest, David Agee Horr, compiler and editor, New York and London: Garland Publishing Company.
 Data were used to contrast Laguna with Taos land use patterns for this report.
- 1974d Pueblo Indians III. Pp. 9-121
- David A. Horr, compiler and editor. Garland Publishing Company, New York and London. Ethnohistoric data on land utilization.
- 1975 Preliminary Report on the Turkey Springs Sites. (Ms. on file, USDA Forest Service, Southwest Regional Office, Albuquerque). Description of high altitude Gallina settlement. (Gallina Cultural District, Santa Fe National Forest).
- 1976 Introduction to Report on Excavation Studies at Rattlesnake Point, 1976 by Ghost Ranch. (Ms. on file, USDA Forest Service, Southwestern Region, Albuquerque.) Her research objectives: examine the living pattern for an entire Gallina home village; investigate the possibility that the Gallina Towers were used for signalling; and discover the relationship between the home villages and the high altitude summer camps. She expects Gallina to have had more heavy dependence on game than other Anasazi groups because of the high altitude camps. She is also concerned with specific features of Gallina phase as these relate to the ethnography of Jemez. (Gallina area, Santa Fe National Forest.)
- n.d. Preliminary Report on the Turkey Springs Sites. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.) This report is not detailed; however, Ellis suspects that the sites represent the transitional period between the Rosa and Gallina Phases. The sites are located between 8300 and 10,000 feet, contain structures, manos and metates. Ellis believes they may represent seasonal "summer" camps. (Gallina area, Santa Fe National Forest.)
- Ellis, Florence H. and J. J. Brody
 1964 Ceramic Stratigraphy and Tribal History at Taos Pueblo. American Antiquity 29(3):316-327.
 Two cuts made: one in Cornfield Taos (the ancestral Taos village), and one in Mound III, the oldest trash mound at modern Taos, in

- connection with the Indian Land Claims action. They would date the Taos material in three complexes. Complex I (900-1300) is characterized by Taos Black-on-white, Taos Tooled, and Taos Utility, with occasional Poge, Galisteo, or Wiyo trade sherds. Complex I includes 21 known sites, Complex II (1300-1600) contains Taos-Poge Black-on-white, San Juan Red-on-orange, Tewa Polychrome; 10 sites were found. Complex III (1600-present). Cuts indicate continuous occupation from Cornfield Taos to Modern Taos. (Taos Area, Carson National Forest.)
- Ellis, Richard N., ed.
1971 New Mexico Past and Present, a Historical Reader, Albuquerque: University of New Mexico Press. Key historic documents (excerpted) relating to the history of New Mexico.
- Enloe, James G., Andrew T. Smith and Stewart L. Peckham
1974 An Archaeological Survey of the San Juan-to-Ojo 345 KV Transmission Line Northwestern New Mexico. (Ms. on file USDA Forest Service, Southwestern Regional Office, Albuquerque, and Laboratory of Anthropology, Santa Fe).
Sites are categorized as "non-ceramic," Rio Grande Anasazi, and Anasazi of the Gallina Phase. Of the non-ceramic sites, seven are particularly interesting, because they may be Archaic and the Archaic is not well-documented for the Chama area. The Rio Grande Anasazi sites are probably small sites and garden sites associated with the larger pueblos in the area (ie. Abiquiu, Tsama and Poshuouinge). Nine Gallina Phase sites were located. (Gallina Area and Chama Area, Carson National Forest.)
- Espinosa, J. M.
1936 Governor Vargas in Colorado, New Mexico Historical Review 11:179-87.
- Euler, Robert C. and Susan M. Chandler
1978 Aspects of Prehistoric Settlement Patterns in Grand Canyon, pp. 73-85 in Investigations of the Southwestern Anthropological Research Group, edited by Robert C. Euler and George J. Gumerman, Flagstaff: Museum of Northern Arizona.
- Evans, Glynn L.
1961 The Friesenhahn Cave, Bulletin of the Texas Memorial Museum 2(1):7-22, Austin. (PaleoIndian.)
- Farwell, Robin E.
1977 Report on Archaeological Excavations of four sites along New Mexico State Highway I-40, Tijeras Canyon, New Mexico. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe, and USDA Forest Service, Southwestern Regional Office, Albuquerque.)
Descriptions of LA 10729, LA 12843, LA 12845 and LA 5227. Farwell suggests that LA 10729, 12843 and 12845 are Late Basketmaker-Pueblo I. LA 5227, the Tijeras Plaza Site is historic. Ceramic and faunal analyses are included. (Albuquerque, Cibola National Forest.)
- Ferdon, Edwin
1946 An Excavation of Hermit's Cave, New Mexico, Monographs of the School of American Research No. 10, Santa Fe. (General overview, PaleoIndian.)
- 1955 A Trial Survey of Mexican-Southwestern Architectural Parallels, School of American Research Monograph 21, Santa Fe.
- Fiero, K.
1976 LA 11850: A Gallina Phase Village Laboratory of Anthropology Notes. No. 111f. Museum of New Mexico, Santa Fe.
Field report of a late Gallina Phase site. (Santa Fe National Forest.)
- Figgins, Jesse W.
1927 The Antiquity of Man in America, Natural History, 27:229-239. Discussion of the Folsom type site.

Findley, James S., Arthur H. Harris, Don E. Wilson and Clyde Jones

1975 Mammals of New Mexico, Albuquerque: University of New Mexico Press.

Standard up to date reference work. Distribution maps are given as well as collection and sighting records.

Fisher, Reginald

1942 Hispanic People of the Rio Grande, El Palacio, 49:157-162.

Flannery, Kent V.

1967 The Olmec and the Valley of Oaxaca: a Model for Inter-Regional Interaction in Formative Times. Pp. 79-110 in Dumbarton Oaks Conference on the Olmec, Elizabeth P. Benson, ed. Washington: Dumbarton Oaks Research Collection and Library. One of Flannery's major theoretical contributions. The discussion involves the use of luxury or status items as mechanisms of affiliation.

1968 Archeological Systems Theory and Early Mesoamerica, pp. 67-87 in B. J. Meggers, ed., Anthropological Archeology in the Americas, Anthropological Society of Washington, D. C.

Discussion of the role of scheduling decisions and their potential utility in describing the dynamics involved in the transition from hunting and gathering to agriculture in Mesoamerica.

1972 The Cultural Evolution of Civilizations. Annual Review of Ecology and Systematics 3:399-426.

A multi-causal model of cultural evolution in systemic terms.

Fliedner, Dietrick

1975 Pre-Spanish Pueblos in New Mexico. In Annals of the Association of American Geographers 65(3):363-377.

This article reports field observations in the Upper Jemez Area, centering on the sites of Unshagi, Nanishagi, and Hot Springs

Pueblo. His concern is with describing the spatial relationship among the three big sites and some 277 "small buildings," possible field locations and pre-historic foot trails (which are still visible). He estimates that about 500 to 625 acres of cultivated land belonged to Unshagi, which had an estimated population of 500 to 550 (his estimate), with a population density of 200 per square mile. (Pajarito Plateau, Santa Fe National Forest.)

Flynn, Leo L. and W. James Judge

1973 An Archeological Assessment of the Canada de Cochiti Grant. (Ms. Department of Anthropology, University of New Mexico, Albuquerque). Report provides a detailed history of the grant, archeological work prior to 1973, and the isolation of "patterns" that served as the basis of the Office of Contract Archeology Cochiti Project. (Pajarito Plateau, Santa Fe National Forest.)

Forbes, Jack D.

1960 Apache, Navajo and Spaniard, University of Oklahoma Press, Norman.

Forbes' book contains interesting information about the interaction of these groups in the historic period. Some of his interpretations should be evaluated against other works.

Ford, R. I.

1968 An Ecological Analysis Involving the Population of San Juan Pueblo, New Mexico. (Unpublished Ph.D. dissertation, University of Michigan, Ann Arbor.) Especially relevant for archeologists.

1971 An Analysis of the Floral Materials from LA 34, LA 272, and LA 9154, In David H. Snow, ed. Excavations at Cochiti Dame, New Mexico 1964-1966 Season, Volume I: L.A. 272, L.A. 9154, L.A. 34 (Museum of Anthropology university of Michigan, Ethnobotanical Report,

- 435, Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.)
- Ford, Richard I., Albert H. Schroeder and Stewart L. Peckham
1972 Three Perspectives on Puebloan Prehistory. Pp. 22-40 in Alfonso A. Ortiz, editor, New Perspectives on the Pueblos, School of American Research Book, Albuquerque: University of New Mexico Press.
Three attempts to reconstruct migrations and the locations of ancestral Tiwa, Tewa, Towa, Hopi, Keresan and Zuni. The authors do not reach agreement.
- Fosberg, Stephen and John Husler
1977 Pedology in the Service of Archeology: Soil Testing at LA 13086 (Ms. on file, Office of Contract Archeology, University of New Mexico, Albuquerque.) A superb discussion of chemical tests done at a probable field house in White Rock Canyon. The authors suggest that salinization may have been a problem for Anasazi agriculture. The paper also discusses the kinds of data which may be obtained through proper testing and sophisticated chemical analysis of soils.
- Francis, E. K.
1956 "Multiple Intergroup Relations in the Upper Rio Grande Region," American Sociological Review 21:84-87.
Brief historical overview of ethnic groups.
- Frazer, Robert W.
1965 Forts of the West, University of Oklahoma Press, Norman.
- Fried, Morton H.
1960 On the Evolution of Social Stratification and the State, pp. 713-731 in Culture in History, Essays in Honor of Paul Radin, Stanley Diamond, ed., Columbia University Press, New York.
1967 The Evolution of Political Society, An Essay in Political Anthropology, Random House, New York.
- Frisbie, Theodore R.
1967 The Excavation and Interpretation of the Artificial Leg Basket Maker III - Pueblo I sites near Corrales, New Mexico. (Unpublished M.A. Thesis, Department of Anthropology, University of New Mexico, Albuquerque).
The sites, just west of Corrales on land belonging to Rio Rancho Corporation were discovered by F. H. Ellis in 1951. Frisbie provides a history of work in the area and detailed description of the sites. There are three sites, consisting of pit house villages. In addition, results of a survey from Kuaua south for 7 miles are discussed. The Artificial Leg sites are important because of their transitional character and early date. (Albuquerque, Cibola National Forest.)
- Frisbie, T. R., B. M. Moore and R. H. Spielbauer
1970 The James Webb Young Ranch Survey 1969 A Preliminary Report (Ms. on file, Office of Contract Archeology, University of New Mexico).
Survey was limited primarily to the Rio Chiquito portion of the ranch. An overview of the prehistoric remains in the area is given.
- Frisson, George C., editor
1974 The Casper Site: A Hell Gap Bison Kill on the High Plains, Academic Press, New York.
General overview relevant to PaleoIndian section. Frisson's work combines detailed analysis and experimentation in interpretation of the site.
- Fritts, Harold C.
1965 Tree-ring Evidence for Climatic Changes in Western North America, Monthly Weather Review 93: 421-443.
- Fritts, Harold C., David G. Smith and Marvin A. Stokes
1965 The Biological Model for Paleoclimatic Interpretation of Mesa Verde Tree-Ring Series.

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American Archaeology, No. 19.

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Precipitation, Temperature,
Evaporation, and Wind. Monthly
and Annual Means 1850-1975.
Socorro, New Mexico: W. K.
Summers Associates.
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Botanical Museum Leaflet 20:
117-160, Harvard University,
Cambridge.

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1977 The Ecological Evolution of Culture:
The State as Predator in
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Jonathon E. Ericson, eds. New
York: Academic Press.

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Controversy, 1846-1861,
Albuquerque: University of New
Mexico Press.

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1977 An Archeological Survey of Three
Tracts in the Manzano Mountains
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Contract Archeology, University
of New Mexico, Albuquerque).
One site located and avoidance
recommended. The site is appar-
ently Late Developmental (ca.
A.D. 1100) at an elevation of 6030
feet. (Albuquerque, Cibola
National Forest.)

Gauthier, Rory, Patricia A. Prince, and
Frances Joan Mathien
1978 An Archeological Sample Survey
of Proposed Timber Sales Areas
on the Picuris Pueblo Reservation
(report submitted to the Bureau

of Indian Affairs). (Ms. on file,
Office of Contract Archeology,
University of New Mexico,
Albuquerque.)

Provides a good annotated bibliog-
raphy of Picuris and Taos areas.
Considerable attention given, in
the report, to agricultural
systems and field features.
(Taos Area, Carson National
Forest.)

Glassow, Michael A.
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A Systems Perspective. Pp.
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Carbondale: Southern Illinois
University Press.

1972b The Evolution of Early Agricul-
tural Facilities Systems in the
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lished PhD dissertation, Depart-
ment of Anthropology, University
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the specific archeology of the
Ponil Drainage. (Taos area,
Carson National Forest.)

Gonzalez, Nancie L.
1969 The Spanish-Americans of New
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Albuquerque: University of New
Mexico Press.
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pological and historical materials.

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Southern Illinois University Press.
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struct Clovis social organization
based on hunting strategies.

Goss, J. A.
1972 Ute Lexical and Phonological
Patterns (Unpublished PhD Disser-
tation, Department of Anthro-
pology, University of Chicago.)

Grady, Mark and E. Pierre Morenon
1977 Conservation Archaeology, Middle

- Range Theory, and the Prediction of Past Land Uses. (Paper presented at the Society for American Archaeology, Annual Meetings, New Orleans, 1977. Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)
- This paper presents the more important results of the 1975 and 1976 Fort Burgwin Research in the Taos area. In addition, the authors discuss the problems of prediction and explanation, the need for development of middle range theory and work within a regional context. (Taos area, Carson National Forest.)
- Green, Ernestene L.
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- Green, R. C.
1956 A Pithouse of the Gallina Phase. American Antiquity 33(2):149-155. (Gallina Cultural District, Santa Fe National Forest.)
- 1964 The Carricito Community. El Palacio 69(3):27-39. (Gallina Cultural District, Santa Fe National Forest.)
- Green, R. C., M. A. Danfelter and G. Vivian
1953 Interpretation of Bg 91: A Specialized Largo-Gallina Surface Structure. El Palacio 65(2):42-61. Report on a "Pueblo-like" structure, apparently used as a granary. (Gallina Cultural District, Santa Fe National Forest.)
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- Gregg, Josiah
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- Gregg, K. L., editor
1952 The Road to Santa Fe: Journals and Diaries of G. S. Sibley, Albuquerque: University of New Mexico Press.
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1971 The Distribution of Prehistoric Population Aggregates, Prescott College Anthropological Reports, No. 1, Prescott College Press, Prescott.
Report of the First Annual Meeting of the Southwestern Anthropological Group (SARG).
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1974 The Jicarilla Apaches, Dekalb: Northern Illinois Press.
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- Gunnerson, James H.
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- 1960 An Introduction to Plains Apache Archeology: The Dismal River Aspect, Bureau of American Ethnology Bulletin 173: 131-260, Washington.
- 1969 Apache Archaeology in Northeastern New Mexico. American Antiquity 34(1):23-39.
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- 1970 Evidence of Apaches at Pecos,

El Palacio 76(3):1-16.
Describes Ocate Micaceous and Apache point types.

- 1971 Apachean Culture: A Study in Unity and Diversity, In Apachean Culture History and Ethnology, Keith Basso ed. Anthropological Papers of the University of Arizona, No. 21, Tucson.
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1942 The Changing Physical Environment of the Hopi Indians of Arizona. Papers of the Peabody Museum of American Archaeology and Ethnology 35(1):1-85.
Standard reference for Hopi agricultural technology. (General overview.)
- Hackett, C. W.
1937 Historical Documents Relating to New Mexico, Nueva Viscaya, and Approaches Thereto, to 1773, Carnegie Institution of Washington, Publication No. 330, Vol. III, Washington.
- Hackett, C. W. and C. C. Shelby
1942 Revolt of the Pueblo Indians of New Mexico, Albuquerque: University of New Mexico Press.
- Hall, Edward T., Jr.
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- Hall, Stephen A.
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- Hammack, Laurens C.
1964 The Archaeology of the Ute Dam and Reservoir in Northeastern New Mexico. (Unpublished M.A. Thesis, Department of Anthropology, University of New Mexico, Albuquerque).
- Report of Salvage conducted for the Interstate Stream Commission, with funds from the Museum of New Mexico, during the summer of 1962. Although outside the area presently under study, the work contains descriptive data from LA 5573, which is important because it is a cave site with cultural/ temporal components. The report also contains discussions of excavated tipi-ring sites, and lithic scatters. The latter were the most common type of site within the area. (Taos Area, Carson National Forest.)
- 1965 The Lagunitas Highway Salvage Project, Laboratory of Anthropology Notes No. 33. Museum of New Mexico, Santa Fe. Excavation of an isolated pithouse of the Gallina Phase. (Santa Fe National Forest.)
- 1966 The Tunnard Site, Museum of New Mexico Research Records, No. 3, Santa Fe.
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- Hawley, Florence and Donovan Senter
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Mesa Verde National Park.

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- Hayes, Alden C. and Thomas C. Windes
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- Haynes, C. Vance, Jr. and George Agogino
1966 Prehistoric Springs and Geochronology of the Clovis Site, New Mexico. American Antiquity 31(6):812-821. (General overview, pertaining to PaleoIndian.)
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1968 Mammoth Bone Shaft Wrench from Murray Springs Arizona. Science 159:186-187. (General overview, pertaining to PaleoIndian.)
- Henderson, J. and John F. Harrington
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- 1977b An Archeological Survey of the Upper Ranchos Timber Sale, Taos District, Carson National Forest. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque). (Taos Area, Carson National Forest.)
- 1977c An Archeological Survey of the Proposed Rincon Timber Sale, Taos District, Carson National Forest. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.) Notes lithic debris and a tentatively dated PaleoIndian point fragment at high elevations. (Taos Area, Carson National Forest.)
- 1977d An Archeological Survey of the Alamitos Timber Sale, Penasco District, Carson National Forest. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque). Lithics, including a tentatively dated PaleoIndian Point, found at high elevations. (Taos Area, Carson National Forest.)
- Hendron, J. W.
1940 Prehistory of El Rito de los Frijoles, Bandelier National Monument, Southwestern Monuments Association Technical Series No. 1, Coolidge. This is still a classic report of survey and excavation in Bandelier. Relevant to the Pajarito Plateau District.
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- Herold, Laurence C. and Ralph A. Luebben
1968 Papers on Taos Archaeology Fort Burgwin Research Center No. 7. (Taos Area, Carson National Forest.)
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1962 Early Navajo Migrations and Acculturation in the Southwest, Papers in Anthropology, No. 6.

- Museum of New Mexico, Santa Fe. Hester discusses evidence supporting a Plains to Southwest Route for the early Athabascan movements into the Southwest and subsequent Pueblo-Navajo interaction.
- 1972 Blackwater Locality No. 1, Taos: Fort Burgwin Research Center. (General overview PaleoIndian.)
- Hester, J. N. and J. L. Shiner
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- Hewett, Edgar L.
1904 Studies in the Extinct Pueblo of Pecos, American Anthropologist, 6(4):426-439.
Early report relevant to the Santa Fe District.
- 1905 A General View of the Archaeology of the Pueblo Region, Annual Report of the Smithsonian Institution for 1904, pp. 583-602.
- 1906 Antiquities of the Jemez Plateau, New Mexico. Bureau of American Ethnology, Bulletin 2 Smithsonian Institution, Washington, D. C. Government Printing Office. 55 pages plus maps and figures. This is an overview of some of the more important ruins among the "vast" numbers Hewett saw. He discusses the ruins in terms of three major geographical areas: I. The Pajarito Plateau - 27 ruins with sketch maps and details of most; II. The Chama drainage (the lower 100 miles): 12 major ruins with sketch maps and details; and III. the Jemez Valley: 9 ruins or groups of ruins with sketch maps and details. (Pajarito Plateau, Santa Fe National Forest.)
- 1908 Excavations at Puye in 1907, Papers of the School of American Archaeology, No. 4, Santa Fe. Data are relevant to the archaeology of the Pajarito District.
- 1909a The Excavations at Tyounyi, New Mexico, in 1908, American Anthropologist 11:434-455.
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- Hewett, Edgar Lee, Junius Henderson, and Wilfred William Robbins
1913 The Physiography of the Rio Grande Valley, New Mexico, in Relation to Pueblo Culture. Bureau of American Ethnology, Bulletin 54. Smithsonian Institution, Washington, D.C. Government Printing Office. 76 pages.
This is an early overview and quite general. A number of factors (absence of algae and aquatic insect larva in the Rito de los Frijoles and a preponderance of juniper seedlings in ecotones) suggest a recent drought ca. 1913. Henderson notes an exposure of olivine basalt in El Rito de los Frijoles canyon which might be the source of archeological "clinking stones." (Pajarito Plateau, Santa Fe National Forest.)
- Hibben, Frank C.
1936 The Excavation of a pre-Biscuit Ware Ruin in the Chama Valley, El Palacio 41(8, 9, 10):48-53. Brief report on the Riana Ruin. The excavation is covered more completely in Hibben's 1937 report.
- 1937 Excavation of the Riana Ruin and Chama Valley Survey, The University of New Mexico Anthropological Series, Bulletin #300 Vol. 2 no. 1.
The survey report contains descriptive data on the kinds of ruins found in the Chama Valley area. The excavation of the

- Riana Ruin is given in detail, with good data on fauna recovered, architecture, and ceramics. The reports are relevant for the Carson National Forest.
- 1938 The Gallina Phase. American Antiquity 14(2):131-136. Distinguishes the Gallina Phase from Mera's Largo phase and discusses some of the ruins. Relevant to the Santa Fe National Forest.
- 1940 The Gallina Culture of North Central New Mexico. (Unpublished PhD dissertation, Harvard University). Provides detailed discussion of Gallina Phase architecture and ceramics. Relevant to the Santa Fe National Forest.
- 1941 Evidences of Early Occupation in Sandia Cave, New Mexico and Other Sites in the Sandia-Manzano Region. Smithsonian Miscellaneous Collections 99(23):1-44. (Albuquerque, Cibola National Forest.)
- 1944 The Mystery of the Stone Towers. Saturday Evening Post. December 9, 1944:14-24, 68-70. Popular and misleading account of the Gallina ruins. (Gallina area, Santa Fe National Forest.)
- 1948 The Gallina Architectural Forms, American Antiquity 14(1):32-36.
- 1949 The pottery of the Gallina Complex. American Antiquity 14(3):194:202. (Gallina Cultural District, Santa Fe National Forest.)
- 1951 A Survey of Sites of the PaleoIndian in the Middle Rio Grande Valley, New Mexico, The Texas Journal of Science, 3: 362-367. (General overview, PaleoIndian period.)
- 1955 Specimens from Sandia Cave and Their Possible Significance. Science 122:688-689.
- (Albuquerque, Cibola National Forest.)
- 1957 Comments following the Johnson 1957 Article. Science 125:235. (Albuquerque, Cibola National Forest.)
- Hickerson, Harold
1965 The Virginia Deer and Intertribal Buffer Zones in the Upper Mississippi Valley. Pp. 43-66 in Man, Culture, and Animals, The Role of Animals in Human Ecological Adjustments, Anthony Leeds and Andrew P. Vayda, eds., Washington, D.C.: American Association for the Advancement of Science.
- Hill, A. T. and George Metcalf
1941 A Site of the Dismal River Aspect in Chase County Nebraska, Nebraska History Vol. 22, No. 2, Lincoln. Of general relevance to Plains-Pueblo interaction.
- Hill, James N. and Joel Gunn, eds.
1977 The Individual in Prehistory: Studies of variability in Style in Prehistoric Technologies. New York: Academic Press. A series of essays on methods of distinguishing the artifacts produced by individuals.
- Hill, James N. et al.
1978 Preliminary Report of 1977 Survey on the Pajarito Plateau, Santa Fe National Forest (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque). As a preliminary report, there is not a great deal of information; however, Hill does say that Archaic sites were encountered during his survey. These were determined to be Archaic on the basis of diagnostic point types.
- Hoijer, Harry
1956 The Chronology of the Athapaskan Languages, International Journal of American Linguistics 22(4): 219-232. Discusses the approximate dates for the separation of Athapaskan

- languages, based on glottochronology.
- Holbrook, Sally
1975 Prehistoric Paleoecology of Northwestern New Mexico. (Unpublished PhD Dissertation, Department of Biology, University of California, Berkeley.)
Her study area centered on Llaves, where she collected information on modern small rodent populations, climate records and faunal material from 14 excavated sites (both pit and unit houses). Unfortunately, her only dates are archeomagnetic. Nevertheless, she concludes that a substantial climatic and environmental change took place beginning about AD 1000. Early faunas are mesic adapted, intermediate faunas are identical to those in the study area today and late faunas are xeric adapted species. (Gallina Area, Santa Fe.)
- Holbrook, Sally J. and James C. Mackey
1976 Prehistoric Environmental Change in Northern New Mexico: Evidence from a Gallina Phase Archaeological Site, The Kiva 41:309-317.
Two occupation units of LA12072, a unit house in the Llaves area, are examined. (Gallina Cultural District, Santa Fe National Forest.)
- Holden, Jan
1955 A Preliminary Report on Arrowhead Ruin, El Palacio 62(4): 102-119.
Report of excavation of a 79 room site on Glorieta Arroyo which dates to ca. late 1300s. Relevant for the Santa Fe District.
- Holschlag, Stephanie L.
1975 Pot Creek Pueblo and the Question of Prehistoric Northern Tiwa Household Configuration. (Unpublished PhD Dissertation, Washington State University).
Presents detailed linguistic, ethnographic and archeological data relevant to Tiwa prehistory. (Taos Area, Carson National Forest.)
- Honea, Kenneth
1965 Evolution of Lithic Traditions of the Southwest. El Palacio 72(4): 32-36.
Honea suggests that cultural sequences based on projectile points alone are inadequate and advocates the approach used first by Francois Bordes in delineating lithic changes over time through the frequency of other artifact categories. Unfortunately he does not actually do such a study in this report. (General overview.)
- 1969 The Rio Grande Complex and the Northern Plains. Plains Anthropologist 14-43:57-70.
A discussion of the La Bolsa Site in the Galisteo Basin, a review of Renaud's Upper Rio Grande Culture, and its possible relationships to Jay Phase materials. (General overview, Archaic and Santa Fe Area, Santa Fe National Forest.)
- 1971 LA 272: The Dead Horse Site, in David H. Snow ed., Excavations at Cochiti Dam, New Mexico 1964-1966 Season, Volume I: LA 272, L.A. 9154, L.A. 34 (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.)
Report of the excavation of three pithouses and associated surface structures on the Santa Fe River, which seem to date to about A.D. 900.
- Houghton, Frank E.
1959 Climate of New Mexico. United States Department of Commerce/ National Oceanic and Atmospheric Administration/Environmental Data Service. Silver Spring, Maryland.
A brief climatic and geographic description of New Mexico. Included are monthly and yearly averages of temperature and precipitation with frost and solar radiation data where available. Maps include temperature and precipitation means. (General overview, pertaining to climatology.)

- 1960 Red River, New Mexico. United States Department of Commerce. Environmental Science Service Administration. Climatography of the U. S. No. 21-29-1. Climatological summary of Red River, New Mexico from 1951-1960 in monthly averages. (General overview, pertaining to climatology.)
- Hume, Valerie
1973 Significance of Archeological Sites on the Garrapata Ridge to Proposed Dissertation Research. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)
Prior research by Hume indicates that human utilization of Garrapata Ridge spans a time from ca. 3000 B.C. until late prehistoric time. She wants to document changes and continuity in settlement patterns and resource utilization over time and reconsider area chronology. She is most concerned with limited activity sites and assumes that these are located for the exploitation of a single resource. (Taos Area, Carson National Forest.)
- 1974a Preliminary Report for the 1974 Field Season on Garrapata Ridge. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)
Reports on work done in two transects both in Upper Sonoran zone but contrasted in slope, altitude, drainage and proximity to a different zonal type. She provides computer plots of artifact densites. Her main problem seems chronological which is reasonable considering that she is dealing with lithics. (Taos Area, Carson National Forest.)
- 1974b Archeological Survey in the Carson National Forest, Summer 1973. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)
Work on archeological material endangered by the Sewage Lagoon Project (both Carson and Private land). Her method involved taking transit readings on every artifact in order to document activity areas. She noted that every outcrop of basalt is accompanied by lithic workshop material. Those above 7400' are associated with campsites which may be Archaic and those at 7200' with pithouses and walled surface features. (Taos Area, Carson National Forest.)
- Hunt, Charles B.
1967 Physiography of the United States, San Francisco and London: W. H. Freeman and Company. A recent and general text book.
- Huscher, B. H. and H. A. Huscher
1942 "Athapascan Migration Via the Intermontane Region," American Antiquity 8(1):80-88.
The Huschers postulate a route of Athapascan migration into the Southwest through the Rocky Mountains based on finds of circular masonry houses and pointed bottom pots in the Colorado Rockies.
- 1943 The Hogan Builders of Colorado. Gunnison: Colorado Archaeological Society.
This reference provides an expanded version of the American Antiquity article cited above.
- Husted, Wilfred M.
1965 Early Occupation of the Colorado Front Range. American Antiquity 30(4):494-498.
Report of Paleo-Indian artifacts found in Rocky Mountain National Park, Colorado. Cody complex, Colvis points, Jimmy Allen points, Agate Basin points and Meserve points were found at high altitude sites. (General overview, pertaining to PaleoIndian.)
- Irwin, Henry T.
1971 Developments in Early Man Studies in Western North American, 1960-1970. Arctic Anthropology 8(2):42-67.
(General overview, PaleoIndian.)
- Irwin, Henry T. and H. M. Wormington
1970 Paleo-Indian Tool Types in the Great Plains, American Antiquity 35(1): 24-34.

(General overview, PaleoIndian.)

Irwin-Williams, Cynthia

1967a Excavations at La Bajada. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)

This report mentions two sites LA 9500 and LA 9501 which apparently are part of the Anasazi Origins project. Unfortunately, the report does not mention where the sites are and there is no information on them at the Laboratory of Anthropology. (Santa Fe National Forest.)

1967b PICOSA: The Elementary Southwestern Culture. American Antiquity 32(4):441-456. Discussion of the distinctiveness of the Southwest as this developed during the Archaic, and the delineation of the northern, southern and western traditions (Cochise, San Dieguito and Oshara). Also discusses the two levels of analysis necessary to differentiating "functional" from cultural-historical traits. (General overview, Archaic.)

1973 The Oshara Tradition: Origins of Anasazi Culture. Eastern New Mexico University Contributions in Anthropology 5(1). Eastern New Mexico University, PaleoIndian Institute, Portales. Report summarizes results of the 1964 - 1970 Arroyo Cuervo Anasazi Origins project. This is the basic synthesis currently available on the northern PICOSA. (General overview, Archaic.)

1977 A Network Model for the Analysis of Prehistoric Trade. Pp. 141-152 in Exchange Systems in Prehistory, T. K. Earle and J. E. Ericson, eds. New York: Academic Press.

Provides a theoretic approach to trade and exchange systems.

n.d. Paleo-Indian and Archaic Cultural Systems in the Southwestern United States. (Ms. prepared for the Handbook of North American Indians, Southwest Volume. Alfonso A. Ortiz, ed.)

This detailed review article, provides paleoenvironmental data, and a review of cultural sequences from the Late Pleistocene through the Archaic. Some of the material on the Oshara Tradition has not yet appeared elsewhere.

(General overview, Archaic.)

Irwin-Williams, Cynthia and C. Vance Haynes

1970 Climatic Change and Early Population Dynamics in South-western United States. Quaternary Research 1: 59-71.

(General overview, pertaining to PaleoIndian.)

Irwin-Williams, Cynthia and Henry Irwin

1966 Excavations at Magic Mountain: A Diachronic Study of Plains-Southwest Relations, Denver Museum of Natural History, Proceedings 12, Denver.

(General overview, especially relevant for the Archaic.)

Irwin-Williams, Cynthia and S. Tompkins

1968 Excavations at En Medio Shelter, New Mexico. Interim Report of the Anasazi Origins Project of Eastern New Mexico University. Eastern New Mexico University Contributions in Anthropology 1(2). PaleoIndian Institute, Eastern New Mexico University, Portales.

En Medio Shelter, on a tributary of the Rio Puerco, yielded materials dating from the Late San Jose Complex through Pueblo IV. This volume provides detailed description of the Late San Jose through Basketmaker III artifacts, feature descriptions, C14 dates and comparisons. (General overview, pertaining to Archaic, Albuquerque area.)

Irwin-Williams, C. et al.

1973 Hell Gap: Paleo-Indian Occupation on the High Plains. Plains Anthropologist 18 (59):40-53.

(General overview, pertaining to PaleoIndian.)

James, Harold L.

1966 The Santa Fe Trail. In Guidebook of Taos - Raton - Spanish Peaks Country. Stuart A. Northrop

and Charles B. Read, eds. New Mexico Geological Society Seventeenth Field Conference.

Good, brief historical treatment of the opening and commerce along the trail. (Taos Area, Carson National Forest.)

- 1974 The Way of the Fray: A Pictorial Diary of the Escalante Expedition through North-Central New Mexico, 1776. Pp. 77-82 in New Mexico Geological Society Guidebook, 25th Field Conference, Ghost Ranch. Charles T. Siemers ed.

A brief narrative of the route of the Escalante expedition with a useful map. (Gallina and Chama Area, Carson and Santa Fe National Forests.)

Jeancon, J. A.

- 1912 Ruins at Pesedeuinge, Records of the Past, 11(1):28-37.

Very early exploratory account. Relevant to the Chama and Pajarito Districts.

- 1919 Preliminary Report of the Excavations at Po-Shu-Ouinge Near Abiquiu, El Palacio 7(4):66-69. The site is a large Biscuit ware site in the Chama District. Relevant for the Carson National Forest.

- 1923 Excavations in the Chama Valley, Bureau of American Ethnology, Bulletin 81, Washington, D. C. Report contains detail on the excavation of Po-Shu-Ouinge and describes other archeological sites and rock art in the Chama District. Relevant to Carson National Forest.

- 1929 Archeological Investigations in the Taos Valley, New Mexico, During 1920. Smithsonian Miscellaneous Collections 81(12). Smithsonian Institution, Washington, D.C.

Jeacon notes a number of ruins he saw in the area including low "towers". He also discusses some of his work and observations at "the Bagley Ranch," Pot Creek, and the Llano Ruin. (Taos Area, Carson National Forest.)

Jenkins, Myra Ellen

- 1966 Taos Pueblo and its Neighbors, New Mexico Historical Review, 41(2).

- 1967 Guide to the Spanish Archives of New Mexico, 1621-1821, Santa Fe: National Historical Publications Commission (SRC).

- 1969 Guide to the Mexican Archives of New Mexico, 1821-1846, Santa Fe: National Historical Publications Commission (SRC).

Jenkins, Myra Ellen and Albert H.

Schroeder

- 1974 A Brief History of New Mexico, Albuquerque: University of New Mexico Press.

An official document of the Cultural Properties Review Committee of the State Planning Office. Provides an accurate discussion of New Mexican history with thematic treatment of political and military affairs; commerce and trade; ranching and agriculture; lumbering and mining; science and engineering; architecture; religion and education.

Jett, Stephen C.

- 1964 Pueblo Indian Migrations: An Evaluation of the Physical and Cultural Determinants. American Antiquity 29(3):291-300.

Johansen, Sigurd

- 1948 Rural Social Organization in a Spanish-American Culture Area, University of New Mexico Publications in Social Sciences and Philosophy, No. 1, Albuquerque. Based on field work in Dona Ana County.

Jones, Oakah L., Jr.

- 1966 Pueblo Warriors and Spanish Conquest, Norman: University of Oklahoma Press.

Useful discussion of the role of Pueblo Indians as military troops and the general underestimation of the importance of warfare among the Rio Grande Pueblos.

Jorde, Lynn B.

- 1977 Precipitation Cycles and Cultural

- Buffering in the Prehistoric Southwest. Pp. 385-396 in For Theory Building in Archaeology: Essays on Faunal Remains, Aquatic Resources, Spatial Analysis, and Systemic Modeling, Lewis R. Binford, ed. New York: Academic Press.
- Jorde uses the mathematical device of spectral analysis to examine tree-ring series. He is therefore able to measure changes in the periodicity in rainfall.
- Judd, Neil M.
1922 Archaeological Investigations at Pueblo Bonito, Smithsonian Miscellaneous Collections, 72(15): 106-117.
- Judge, W. James
1970 Systems Analysis and the Folsom-Midland Question, Southwestern Journal of Anthropology 26(1): 40-51.
(General overview, PaleoIndian.)
- 1973 The PaleoIndian Occupation of the Central Rio Grande Valley, New Mexico. Albuquerque: University of New Mexico Press.
(Albuquerque, PaleoIndian.)
- 1974 The Excavation of Tijeras Pueblo 1971-1973: Preliminary Report Cibola National Forest, New Mexico. Archeological Report No. 3, USDA Forest Service, Southwestern Region, Albuquerque, N.M. Discusses the research design and first three seasons of excavation of the University of New Mexico Field School work at LA 581. (Albuquerque, Cibola National Forest.)
- 1976 The Development of a Complex Cultural Ecosystem in the Chaco Basin, New Mexico (Ms. Paper Submitted to the First Conference on Scientific Research in the National Parks, 9-13 November 1976, New Orleans, Louisiana.) An excellent review of new information on Chaco Canyon and environs; includes paleoenvironmental data and a re-interpretation of the Chaco phenomenon.
- n.d. Early Man: Plains and Southwest:
- An Interpretative Summary of the PaleoIndian Occupation of the Plains and Southwest. (Ms. submitted to the Handbook of North American Indian, William C. Sturtevant, ed. for Volume 3.) (General overview, PaleoIndian.)
- Judge, W. James and Jerry Dawson
1972 PaleoIndian Settlement Technology in New Mexico. Science 176:1210-1216.
(Albuquerque Area, PaleoIndian.)
- Kaplan, Lawrence
1963 Archeoethnobotany of Cordova Cave, New Mexico. Economic Botany 17(4):350-359.
(General overview, pertaining to ethnobotany.)
- Kayser, D. W. and G. H. Ewing
1971 Salvage Archaeology in the Galisteo Dam and Reservoir Area, New Mexico (Ms. Laboratory of Anthropology, Museum of New Mexico, Santa Fe).
Reports include LA 9142 - The Signal Site (Historic), LA 6860 - The Wheeler Site (Classic), LA 9147 The Waldo Site (Coalition), LA 356 - La Bolsa Site (Archaic) and a report on the pollen by Schoenwetter. There are also notes on the ceramics by H. Warren.
- Kearney, Thomas H., Robert H. Peebles and collaborators
1951 Arizona Flora. Berkeley: University of California Press.
(General overview, botany).
- Keleher, William A.
1952 Turmoil in New Mexico: 1846-1868, Santa Fe: Rydal Press.
- Kenner, Charles L.
1969 A History of New Mexican-Plains Indians Relations, Norman: University of Oklahoma Press.
Provides discussion of the importance of the "Kiowa trade" in bringing U.S. goods to Spanish New Mexico and how the opening of legal trade with the U.S. during the Mexican period created the climate for increased raiding by Plains groups because a source of their livelihood was disrupted.

- Kidder, Alfred V.
 1915 Pottery of the Pajarito Plateau and of Some Adjacent Regions in New Mexico, Memoir of the American Anthropological Association, V. 2, pp.407-462.
- 1916 The Pueblo of Pecos, Archaeological Institute of America, Papers of the School of American Research, No. 33, Santa Fe. (Relevant to the Santa Fe District.)
- 1917 The Old North Pueblo of Pecos, the Condition of the Main Pecos Ruin, Archaeological Institute of America, Papers of the School of American Research, No. 38, Santa Fe.
- 1924 An Introduction to the Study of Southwestern Archaeology, with a Preliminary Account of the Excavations at Pecos, Papers of the Phillips Academy Southwestern Expedition, No. 1. New Haven. This work constitutes an important historical reference to the research interests of the pioneers of Southwestern archeology, as well as important data on Pecos.
- 1925 Pecos Explorations in 1924, Archaeological Institute of America, Papers of the School of American Research, new series No. 11, Santa Fe.
- 1926a Early Pecos Ruins in the Forked Lightning Ranch, Archaeological Institute of America, Papers of the School of American Research, new series, No. 16, Santa Fe. Contains description of the Forked Lightning Ruin and other, apparently, Coalition sites in the vicinity of Pecos Pueblo. (Relevant to the Santa Fe District.)
- 1926b The Excavations at Pecos in 1925, Archaeological Institute of America, Papers of the School of American Research, new series, No. 14, Santa Fe.
- 1927 Southwestern Archaeological Conference, Science 68:489-491. Report on the first Pecos conference. Includes the basis of developmental schemes.
- 1958 Pecos, New Mexico: Archaeological Notes, Papers of Robert S. Peabody Foundation for Archaeology, No. 5, Andover.
- 1974(reprint) Pottery of the Pajarito Plateau. Notes that Biscuit wares have a more northern distribution than Redwares (Glazes) but that Biscuit predominates at the larger sites of the Pajarito at Otowi, Tsakowi and Tschirege and Redware at Puye, Tyounyi and Yapashi. Suggests possible explanations: I. mixing of two groups of peoples; II. different centers of production with pots distributed by trade; III. one ware played some special role in the ceremonial or mortuary religious life and was more conservative; IV. divergent evolution from a common earlier form. (Pajarito Plateau, Santa Fe National Forest.)
- Kidder, A. V. and A. O. Shepard
 1936 The Pottery of Pecos, Vol. II: The Glaze-paint, Culinary, and other Wares, Papers of the Southwest Expedition, No. 7, Phillips Academy, Andover, Yale University Press. Profusely illustrated classic reference.
- Kirkpatrick, David T.
 1976a The Prehistory of Northeastern New Mexico. Pp. 77-82, New Mexico Geological Society 27th Field Conference, Vermejo Park. Rodney C. Ewing and Barry S. Kues, eds. Brief but fine discussion of work done in the Cimarron area and a synthesis of the prehistory. (Taos Area, Carson National Forest.)
- 1976b Archaeological Investigations in the Cimarron District, Northeastern New Mexico: 1929-1975. AWANYU 4(3):6-15. Article provides a complete archeological history of the Cimarron district as well as a summary of information by culture and time period. (Taos Area, Carson National Forest.)

- 1977 Preliminary Archaeological Survey of Ponil Park, New Mexico (Ms. submitted to Mr. Robert U. Haslanger, Vermejo Park, Raton, New Mexico).
Archival research and site survey on historic structures associated with logging operations at Ponil Park. Contains excellent information about the organization of labor at logging camps, the architecture of early 20th century logging camps, etc.
- Kirkpatrick, David T. and Richard I. Ford
1977 Basketmaker Food Plants from the Cimarron District, Northeastern New Mexico. The Kiva 42(3-4): 257-269.
Good discussion of plant material recovered from dated Basketmaker III sites by flotation. (Taos Area, Carson National Forest.)
- Klaenhammer, Anita M.
1975 Public Service Company San Juan to Ojo Transmission Line Project: Archeological exploration and Salvage at LA 11836, Rio Arriba County, New Mexico, Laboratory of Anthropology Notes No. 111a, Museum of New Mexico, Santa Fe. A quarrying and manufacturing area near Youngsville.
- Klausner, Stephanie
1977 A Cultural Assessment of the Area Proposed for the Future City of Santa Fe Wastewater Treatment Site (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe).
Report contains a list of sites known through a literature search and includes a plan for a remote sensing survey of the area within the city of Santa Fe.
- Kluckhohn, C., W. W. Hill and L. W. Kluckhohn
1971 Navaho Material Culture, Cambridge: The Belknap Press of Harvard University Press. Reference contains excellent photographs in addition to descriptions. Good for the variability in Navajo items and house types.
- Knowlton, Clark S.
1964 One Approach to the Economic and Social and Economic Problems of Northern New Mexico, New Mexico Business 17(9):15-22.
Analysis of program failures in several communities.
- Koczan, Steven
1978 Archeological Investigations, New Mexico State Highway Department I-040-3(55) 171, Tijeras Canyon, New Mexico, Excavation of LA 13812. Museum of New Mexico Research Papers. Santa Fe. (Albuquerque, Cibola National Forest.)
- Kroeber, A. L.
1916 Zuni Potsherds, Anthropological Papers of the American Museum of Natural History, Vol. 18, pt. 1., New York.
The classic study of the application of the direct historical approach in Southwestern archeology.
- Lahren, L. and R. Bonnicksen
1974 Bone Foreshafts From a Clovis Burial in Southwestern Montana. Science 186:147-150. (PaleoIndian.)
- Lambert, Marjorie
1954 Paa-ko. School for America Research Monographs 19. Santa Fe.
Discussion of excavation of prehistoric and historic components of this large, Pueblo III - Pueblo IV site. (Albuquerque, Santa Fe areas.)
- Lang, Richard W.
1976 An Archaeological Survey of Certain Lands Adjacent to the Galisteo Dam, New Mexico. School of American Research, Santa Fe.
(Santa Fe, Santa Fe National Forest.)
1977a Archaeological Survey of the Upper San Cristobal Arroyo Drainage, Galisteo Basin, Santa Fe County, New Mexico, The School of American Research Contract Program, Santa Fe. Lang provides extensive discussion of sites located and interpretations in terms of Galisteo Basin prehistory in general. His

interpretations are heavily influenced by paleoclimatological reconstructions. There is a good deal of information on rock art incorporated in the report.

- 1977b The Prehistoric Pueblo Cultural Sequence in the Northern Rio Grande. (Paper delivered at the 50th Pecos Conference, Pecos, New Mexico).

An overview presented as the introductory paper to the Rio Grande symposium. (General overview).

- 1977c An Archaeological Survey of Certain State Lands within the Drainages of Arroyo de la Vega de los Tanos and Arroyo Tonque Sandoval County, New Mexico, The School of American Research Contract Archaeology Program, Santa Fe.

Report of seven sites within the drainage of Arroyo de la Vega de los Tanos, on state trust land. Sites are described on the basis of survey only. A brief archeological sequence of known sites in the area is given.

Lange, Charles H. Jr.

- 1941 The Evans Site: A Contribution to the Archeology of the Gallina Region, Northern New Mexico. (Unpublished MA thesis, University of New Mexico, Albuquerque.) Provides discussion linking Gallina remains with the Jemez. Relevant to the Santa Fe National Forest.

- 1956 The Evans Site and the Archeology of the Gallina Region of New Mexico. El Palacio 63(3):72-92. A distillation of Lange's 1941 MA thesis. (Gallina Area, Santa Fe National Forest.)

- 1959 Cochiti, a New Mexico Pueblo, Past and Present, Austin: University of Texas Press. Descriptive ethnography.

Lange, Charles H., assembler

- 1968 The Cochiti Dam Archaeological Salvage Project, Part 1: Report on the 1963 Season, Museum of New Mexico Research Records, No. 6, Santa Fe. Reports on the excavations of LA

6461, the Red Snake Hill Site (Late Kwahe'e Period pithouses), the North Bank Site LA 6462 (multi-component site consisting of Kwahe'e pithouses and Santa Fe period surface structures), and LA 6455, the Alfred Herrara Site (multi-component site consisting of pithouses, pit rooms and surface rooms).

Lange, C. H. and Carrol Riley, eds.

- 1966 The Southwestern Journals of Adolf Bandelier 1880-1882, Albuquerque: University of New Mexico Press.

Laumbach, K. W., T. Sudar-Murphy, B. J. Naylor, S. A. Rorex

- 1977 Description of Five Sites in White Rock Canyon: LA 5013, LA 5014, LA 12511, LA 12512 and LA 12522, pp.29-82 In Archeological Investigations in Cochiti Reservoir, New Mexico, Volume 2: Excavation and Analysis 1975 Season, Richard C. Chapman and Jan V. Biella, eds., University of New Mexico, Department of Anthropology, Office of Contract Archeology, Albuquerque.

Laurie, Karen Pillmore

- 1976 History of Vermejo Park. Pp. 87-92 in New Mexico Geological Society Guidebook, 27th Field Conference, Vermejo Park. Rodney C. Ewing and Barry S. Kues, eds. Briefs discussion of both gold mining and logging activity at Vermejo Park and surrounding area. (Taos Area, Carson National Forest.)

Lee, Richard B.

- 1968 What Hunters do for a living, or How to make out on Scarce Resources. Pp. 30-48, in R. B. Lee and I. Devore, eds. Man the Hunter, Chicago: Aldine. Based on field data from the !Kung, Lee observes a considerable amount of "leisure time." !Kung Bushman Subsistence; Pp. 47-79 in A. P. Vayda, ed. Environment and Cultural Behavior, Garden City: Natural History Press.

1969

Lent, Stephen C. and Randall Schalk

- 1977 An Archeological Survey of a 13.5 Mile Power Line Right-of-Way on Santa Clara Pueblo Lands and BLM Lands (Ms. on file, Office of Contract Archeology, University of New Mexico, Albuquerque). Survey for Public Service Company of New Mexico recorded 7 Archaic sites, 2 PI-PII sites and 2 Historic sites. Avoidance was recommended. The report contains a good background statement of Anasazi prehistory.

Leonard, Olen E.

- 1970 The Role of the Land Grant in the Social Organization and Social Processes of a Spanish-American Village in New Mexico, Albuquerque: Calvin Horn, (reprint of 1943 Ph.D Dissertation, Louisiana State University.)
Pertains specifically to El Cerrito.

Lister, Robert H.

- 1948 Notes on the Archaeology of the Watrous Valley, New Mexico. El Palacio 55:35-41.

Brief report on mention of the area from description by Bandelier, Moorehead, Mason, Holden and Renaud and a brief discussion of the excavation of one room at the Lymam site which Lister carried out. (Taos Area.)

- 1966 Contributions to Mesa Verde Archaeology: III, Site 866, and the Cultural Sequence at Four Villages in the Far View Group, Mesa Verde National Park, Colorado. University of Colorado Studies, Series in Anthropology, No. 12, Boulder.

Loose, Ann A.

- 1974 Archeological Excavations Near Arroyo Hondo, Carson National Forest. Archeological Report No. 4. USDA Forest Service, Southwestern Region, Albuquerque. This is a discussion of 8 Valdez Phase sites excavated by University of New Mexico field school between 1965 and 1967. Basically she thinks these sites are earlier than other published Valdez Phase sites because of the

presence of Red Mesa Black-on-white and similarities between these sites and those reported in the Navajo Reservoir area. One archeomagnetic date of A.D. 1120 \pm 25 years obtained from LA 9205 was from a surface structure and not a pithouse. (Taos Area, Carson National Forest.)

Lopez, Larry

- 1975 Taos Valley: A Historical Survey, Boulder: Western Interstate Commission for Higher Education. General history of the Taos Valley. There are biases in the presentation but some very good information as well.

Luebben, Ralph A.

- 1953 Leaf Water Site, In Salvage Archaeology in the Chama Valley, New Mexico, Fred Wendorf, ed. Monographs of the School of American Research, No. 17, Santa Fe.
Discussion of the Leaf Water Site (LA300) a "Wiyo" ruin in the Chama Valley.

- 1968 Site TA 32: A Deep Pit House and Surface Manifestation in North Central New Mexico. In Herold and Luebben, Papers on Taos Archaeology. Fort Burgwin Research Center Report No. 7. Reports the results of the first Grinnell College field Program in Archeology (July 1960). Despite the recovery of much wood the dates are based on the absence of other than Taos Black-on-white, dating the pithouse at A.D. 900-1200. Numerous points suggest hunting as the major activity, but corn (Cutler analysed it as being closer to Pima-Papago than modern Eastern Pueblo corn), a possible bean seed, and a whole turkey were found. (Taos Area, Carson National Forest.)

Lummis, Charles

- 1900 Fray Zarate Salermon's Relacion, Land of Sunshine 12: 39-48, 104-113, 180-187.

Luomala, Katherine

- 1938 Navaho Life of Yesterday and Today Berkeley: Western Museum

Laboratories, U. S. Department of Interior, National Park Service. Provides useful information on locations of various types of Navajo sites, site function and an overview of Navajo history.

Synthesis of evidence from micro-fauna, corn, pollen and geological studies indicating increasing dessication in the Gallina Cultural District after A.D. 1250. (Santa Fe National Forest.)

Lutes, Eugene

- 1959 A Marginal Prehistoric Culture of Northwestern New Mexico. El Palacio 66:59-68.
Report deals with excavation at Philmont Boy Scout Ranch. A slab house and a jacal structure were excavated. Comparisons are made with the Taos area and Herbert Dick's work near Trinidad, Colorado. A suggested chronology is given. (Taos Area, Carson National Forest.)

MacNeish, Richard S.

- 1971 Speculation about How and Why Food Production and Village Life Developed in the Tehuacan Valley, Mexico, Archaeology 24(4): 307-315.

Madirosian, Charles A.

- 1971 Mining Districts and Mineral Deposits of New Mexico. Salt Lake City.
Data used to compile map and table of mining districts and materials mined.

Lyckman, Ernest

- 1976 Railroads in the Taos Area. (Transcribed from Tapes 2 & 3., Radio Station KKIT, December 15, 1976).
An informative account of the impact of railroads on the Taos area from 1878 to 1941. (Taos Area, Carson National Forest.)

Martin, Paul Schultz

- 1963 The Last 10,000 Years, Tucson: University of Arizona Press. A very general overview of paleo-climatic changes using pollen spectra.

- 1973 The Discovery of America, Science 179:969-974.

Computer simulation of Pleistocene kill rates and peopling of the New World.

Martin, Paul Schultz and H. E. Wright, editors

- 1967 Pleistocene Extinctions: The Search for Cause, New Haven: Yale University Press.
(General overview pertaining to PaleoIndian.)

Lyons, Thomas R.

- 1969 A Study of Paleo-Indian and Desert Culture Complexes of the Estancia Valley Area, New Mexico. (Unpublished Ph.D. Dissertation, Department of Anthropology, University of New Mexico, Albuquerque.)
(General overview, pertaining to PaleoIndian.)

Martin, Paul S. and John B. Rinaldo

- 1950 Turkey Foot Ridge Site: A Mogollon Village Pine Lawn Valley, Western New Mexico. Fieldiana: Anthropology 38(2). Chicago Natural History Museum.

Martin, Paul S., John B. Rinaldo, Elaine Bluhm, Hugh Cutler and Roger Grange Jr.
1952 Mogollon Culture Continuity and Change: the Stratigraphic Analysis of Tularosa and Cordova Caves Fieldiana: Anthropology 40. Chicago Natural History Museum, Chicago.
(General overview.)

Maxon, James C.

- 1969 A Study of Two Prehistoric

Lyons, Thomas R. and Robert K. Hitchcock

- 1977 Remote Sensing Interpretation of Anasazi Land Route System. Pp. 111-134 in Aerial Remote Sensing Techniques in Archeology, T. R. Lyons and R. K. Hitchcock, eds. Albuquerque: Reports of the Chaco Center 2. National Park Service and the University of New Mexico.
Good discussion of the Chacoan road system, with maps.

Mackey, James C. and Sally J. Holbrook

- 1978 Environmental Reconstruction and the Abandonment of the Largo-Gallina Area. Journal of Field Archaeology 5(1):29-49.

- Pueblo Sites on the Pajarito Plateau New Mexico (Unpublished M.A. thesis, Department of Anthropology, University of Wisconsin).
Reports consists of a summary of LA 8681 and LA 170. The former is a 21 room masonry pueblo dated to ca. 1200 to 1300. The latter consists of cavate rooms and talus houses on Tshirege Mesa. Excavated rooms seem to date from the Coalition Period into the Classic. (Santa Fe National Forest.)
- McGehee, Ralph M.
1963 Weather: Complex Causes of Aridity; In Carl Hodge and Peter C. Duisberg, eds., Aridity and Man - The Challenge of the Arid Lands in the United States. Washington: Publication 74 American Association for the Advancement of Science.
- McNutt, Charles H.
1969 Early Puebloan Occupation at Tesuque By-Pass and in the Upper Rio Grande Valley. Anthropological Papers of the University of Michigan 40. University of Michigan, Ann Arbor.
Monograph provides discussion of the excavation and interpretation of LA 3294, as well as a re-evaluation of upper middle Rio Grande Prehistory which differs from that of Wendorf and Reed (1955).
- Mehringner, P. J.
1967 Pollen Analysis and the Alluvial Chronology, The Kiva 32:96-101.
- Meinig, D. W.
1971 Southwest: Three Peoples in Geographical Change, 1600-1970, New York: Oxford University Press.
- Mera, H. P.
1933 A Proposed Revision of the Rio Grande Glaze-paint Sequence, Laboratory of Anthropology Technical Series, Bulletin 5, Santa Fe.
Along with Kidder's scheme, provides a classic reference to the glazes.
- 1935 Ceramic Clues to the Prehistory of North Central New Mexico. Laboratory of Anthropology Technical Series, Bulletin 8. Museum of New Mexico, Santa Fe. (General overview, pertaining to Anasazi.)
- 1938 Some Aspects of the Largo Cultural Phase, Northern New Mexico. American Antiquity 3(3): 236-242.
Relevant to the Gallina Cultural District and the Gobernador area. (Santa Fe National Forest.)
- 1940 Population Changes in the Rio Grande Glaze Paint Area. Laboratory of Anthropology Technical Series 9. Santa Fe. (General overview, pertaining to Anasazi.)
- n.d. Report on Excavations at LA 653 and LA 641. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico Santa Fe.)
Report on the excavation of two isolated Gallina structures. (Relevant to the Santa Fe National Forest.)
- Miller, John P., Arthur Montgomery, and Patrick K. Sutherland
1963 Geology of Part of the Southern Sangre de Cristo Mountains, New Mexico. Stratigraphy, Structure and Petrology of the Tesuque-Velarde-Tres Ritos-Cowles Thirty Minute Quadrangle. Memoir II, State Bureau of Mining and Technology. Campus Station, Socorro.
Standard current geological reference. (Taos Area, Carson and Santa Fe National Forests.)
- Mohr, Albert and L. L. Sample
1972 Archaeological Excavation at Site No. LA 102 Rio Arriba County, New Mexico - 1972. Laboratory of Anthropology Notes No. 83. Museum of New Mexico, Santa Fe.
Report of the excavation of "Pueblo-like" structures which seem to have served largely as storage facilities. (Gallina Cultural District, Santa Fe National Forest.)

Montgomery, C. M.
1964 Rock Lake Shelter, El Palacio
71(5-14).

Moorhead, M. L.
1958 New Mexico's Royal Road.
Norman: University of Oklahoma
Press.
Account of the Santa Fe to
Chihuahua road and trade.
(General overview, pertaining to
Historic.)

Morenon, E. Pierre
1975 A Proposal for the Development
of Conservation Techniques and
An Evaluation of Land Use in the
Ranchos de Taos Region. (Ms. on
file, USDA Forest Service, South-
western Regional Office,
Albuquerque.)
His basic research questions
derive from the SARG conferences
and concern the way in which
land surfaces have been used
through time. This proposal
contains his field manual and
survey area maps. (Taos Area,
Carson National Forest.)

1976 An Introduction to Excavations at
"Sagebrush Pueblo". (TA 30: TA
500): 1976. (Ms. on file, Fort
Burgwin Research Center,
Ranchos de Taos, New Mexico).
This paper was prepared for
participants in the Southern
Methodist University summer
archeology field school.
Background to the previous work
at TA:30 and the 1976 research
orientation. (Taos Area, Carson
National Forest.)

1977 A Proposal for the Development
and Evaluation of Artifact and
Site Predictive Model in an Area
Near Ranchos de Taos. (Ms. on
file USDA Forest Service South-
western Regional Office,
Albuquerque.)
Suggests using predictive linear
regression model for non-site (ie.
artifact) densities. The model is
based on elevation, slope, dis-
tance from water and applied to
an area in Kit Carson Forest. He
suggests, that the model should
be drainage specific and that past
human behavior could be expected

to vary from one drainage to
another. (Taos Area, Carson
National Forest.)

Morenon, E. Pierre, Mark Henderson and
Jeff Nielson
1976 The Development of Conservation
Techniques and a Land Use Study
Conducted Near Ranchos de Taos,
New Mexico. (Ms. on file, USDA
Forest Service, Southwestern
Regional Office, Albuquerque).
Presents an evaluation of non-
pickup survey in terms of
efficiency, and evaluation of 11
"propositions" which relate
expected artifact densities and
characteristics of the environ-
ment, and general archeological
considerations. (Taos Area,
Carson National Forest.)

Morenon, E. Pierre and Kathleen H. Quinn
1977 The Evaluation of Predictive
Models and Inferences about
Human Behavior. (Ms. on file
USDA Forest Service, South-
western Regional Office,
Albuquerque.)
This reports the result of work
designed to test notions about:
I. the utility (in terms of infor-
mation gained) of recording
artifact densities (rather than
sites); II. variability in human
behavior from one drainage to
another and III. contrasts in
information obtained when con-
sidering prehistoric and modern
land use. They find a general
artifact (rather than site)
approach useful. They think
specific models using elevation
and slope are more appropriate
than drainage specific ones. In
contrast to prehistoric data,
modern data indicate that the
number of behavioral acts repre-
sented in functional types do
contribute to the density of
artifacts. (Taos Area, Carson
National Forest.)

Morris, Earl H.
1921 The House of the Great Kiva at
the Aztec Ruin, American Museum
of Natural History Anthropological
Papers, Vol 26, pt. 2, New York.
1939 Archaeological Studies in the

- La Plata District, Southwestern Colorado and Northwestern New Mexico. Carnegie Institution of Washington, Publication 519. Washington.
- Morris, Earl H. and Robert F. Burgh
1954 Basket Maker II Sites Near Durango, Colorado, Carnegie Institution of Washington Publication 604, Washington.
- Nelson, Nels C.
1914 Pueblo Ruins of the Galisteo Basin, New Mexico, Anthropological Papers of the American Museum of Natural History 15, pt. 1.
Nelson's classic work involved survey and testing of the Galisteo ruins. Report contains excellent descriptions of the sites and chronological inferences. Minor archeological features are described (i.e. shrines, garden plots etc.).
- Northrop, Stuart A.
1975 Turquoise and Spanish Mines in New Mexico, Albuquerque: University of New Mexico Press. An excellent concise history of early mining, extensively documented, with a good bibliography.
- Oaks, Yvonne Royce
1977 Testing of a Predictive Model for Paleo-Indian Site Location. (Ms. on file, Department of Anthropology, University of New Mexico, Albuquerque). (General overview, pertaining to PaleoIndian.)
- 1978 Excavations at Dead-Man's Curve Tijeras Canyon, New Mexico: New Mexico State Highway Department Projects I-040-3(55) 171 and I-040-3(36) 169. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe).
Report on the Big Boulder Site, Dinosaur Rock and two smaller sites in Tijeras Canyon. Includes complete faunal, ceramic and lithic analysis. (Albuquerque, Cibola National Forest.)
- O'Bryan, Deric
1952 The Abandonment of the Northern Pueblos in the Thirteenth Century, pp. 153-158. In Indian Tribes of Aboriginal America - Selected Papers of the XXIXth International Congress of Americanists, Sol Tax, ed. Chicago: University of Chicago Press.
- Ortiz, Alfonso A.
1969 The Tewa World, Chicago: University of Chicago Press. Detailed structural analysis of Tewa cosmology, ritual, and social organization.
- Ortiz, Alfonso A., editor
1972 New Perspectives on the Pueblos, Albuquerque: University of New Mexico Press (School of American Research).
Selection of contemporary anthropological work ranging from ecology and ethnohistory to ritual and ethnomusicology.
- Ottaway, Harold Nelson
1976 The Penitente Moradas of the Taos, New Mexico, Area. (Unpublished Ph.D. Dissertation, Department of Anthropology, University of Oklahoma, Norman.) (Taos Area, Carson National Forest.)
- Parsons, Elsie C.
1925 The Pueblo of Jemez, Southwestern Expedition Paper No. 3, Phillips Academy Department of Archaeology, Yale University Press, New Haven.
- 1936 Taos Pueblo. Santa Fe: Laboratory of Anthropology. Descriptive ethnography.
- Parsons, Francis B.
1975 Early 17th Century Missions of the Southwest, With Historical Introduction, Tucson: Dale Stuart King, Publisher.
Written from an architect's point of view, contains useful information and is profusely illustrated.
- Pattison, Natalie B.
1968 Nogales Cliff House: A Largo-Gallina Site. (Unpublished MA thesis, University of New Mexico, Albuquerque).

Report contains descriptive information on 11 unit house and surface structures excavated by the University of New Mexico above Llegua Canyon. (Gallina Cultural District, Santa Fe National Forest.)

County, New Mexico. (Revised report) (Ms. on file, U.S.D.A. Forest Service, Southwestern Regional Office, Albuquerque, and Laboratory of Anthropology, Museum of New Mexico, Santa Fe.)

Revised report of the 1958 excavation of LA 3505. Pertains to the Chama District and the Carson National Forest. The report contains some comparisons with the Riana Ruin and Leaf Water Pueblo.

Peckham, Stewart L.

1954 A Pueblo I Site near San Felipe, New Mexico. Highway Salvage Archaeology 1(4):41-51. Excavation of a jacal structure, kiva and pithouse with Lino Gray and "Red Mesa (?)" sherds. (Albuquerque and Santa Fe Areas).

1957 Three Pithouse Sites Near Albuquerque, New Mexico. Highway Salvage Archaeology 3(12). Santa Fe. (Albuquerque, Cibola National Forest).

1966 The Transitional Period. Pp. 10-13 In Contributions to Southwestern Prehistory, VII INQUA. Eastern New Mexico University, Cynthia Irwin-Williams, ed. Boulder and Denver. A brief narrative summary of major prehistoric "trends" between 500 A.D. and 1500. (General overview.)

1974a Report of Archeological Activities, Museum of New Mexico for the Year 1974. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque and Laboratory of Anthropology, Museum of New Mexico, Santa Fe.)

Explains that the emphasis of the Laboratory of Anthropology's work has been toward preservation of resources, because in surveying rights-of-way there is little opportunity to conduct the kinds of broad area surveys which would contribute substantially to the fields of archeology and history. (Gallina and Chama Areas, Santa Fe National Forest.)

1974b The Palisade Ruin La 3505. Archaeological Salvage Excavations Near the Abiquiu Dam, Rio Arriba

Peckham, Stewart and Erik K. Reed

1963 Three Sites Near Ranchos de Taos, New Mexico, Highway Salvage Archaeology 4(3):1-30. LA 3643 was a pithouse. LA 3569, a four room jacal structure and LA 3570 a subterranean room of "unknown" function. Most of the report is a discussion of ceramics. Relevant to the Taos District.

Pettit, R. F. Jr.

1966 History of Mining in Colfax County. Pp. 69-75 in New Mexico Geological Society Guidebook, 17th Field Conference Taos-Raton-Spanish Peaks Country, New Mexico and Colorado. Stuart A. Northrop and Charles B. Read, eds.

History of mining activity from the early 1860's. Of special interest is the discussion of the construction of the "Big Ditch" and reservoirs on Baldy Mountain. (Taos Area, Carson National Forest.)

Plog, Fred

1974a The Study of Prehistoric Change. New York: Academic Press.

1974b Settlement Patterns and Social History, pp. 68-91 in Frontiers in Anthropology, Murray Leaf, ed. New York: Van Nostrand.

Plog, Fred et al.

1968 SARG: Future Research Directions, pp. 177-186 in Investigations of the Southwestern Anthropological Research Group, The Proceedings of the 1976 Conference, Robert C. Euler and

- George J. Gumerman, eds.,
Flagstaff: Museum of Northern
Arizona.
- Powell, Nena
1977 An Archaeological Clearance
Survey of a Proposed Powerline
from Taos to Ojo Caliente, New
Mexico. (Ms. on file, New Mexico
State University, No. 125, Las
Cruces).
Survey includes Carson National
Forest lands and Bureau of Land
Management lands. Four sites are
"Archiac or possible Basketmaker
or Early Anasazi." Two of the
sites are Historic. (Taos Area,
Carson National Forest.)
- Powell, W. J.
1958 Groundwater Resources of the
San Luis Valley, Colorado, USGS
Survey Water-Supply Paper 1379,
1-24. Washington.
Relevant information on the Upper
Rio Grande River Valley.
- Powers, W. E.
1939 Basin and Shore Features of the
Extinct Lake San Agustin, New
Mexico. Journal of Geomorphology
2:345-56.
Geological reconstruction of lake
levels in the Pleistocene-Recent
lake in the San Agustin Basin.
(General overview, pertaining to
Paleoclimatology.)
- Purtyman, William D. and Steven Johansen
1974 General Geohydrology of the
Pajarito Plateau. New Mexico
Geological Society Guidebook, 25th
Field Conference, Ghost Ranch.
Charles T. Siemers, ed.
This is a useful discussion of the
geohydrology of a complex area.
(Pajarito Plateau, Santa Fe
National Forest.)
- Quinn, Kathleen
1976 Excavation of a Burial at Site
AR-03-02-05-87, Carson National
Forest, Near Ranchos de Taos,
Arroyo Miranda. (Ms. on file
USDA Forest Service, South-
western Region Albuquerque).
The burial eroded out of a road
cut, apparently associated with
pithouses and 2 trash areas. She
suggests a date to the early part
of the Valdez Phase because of
lack of Santa Fe Black-on-white.
Notes that dental attrition is less
than that of burials from Pot
Creek. (Taos Area, Carson
National Forest.)
- Reed, Erik K.
1943 The Southern Tewa Pueblos in
the Historic Period, El Palacio
50:254-264.
- 1949 Sources of Upper Rio Grande
Pueblo Culture and Population, El
Palacio 56:163-184.
Attempt to reconstruct migration
routes.
- Reeve, Frank D.
1964 New Mexico, a Short Illustrated
History. Denver: Sage Books.
- Reichard, G. A.
1928 Social Life of the Navaho Indians,
Columbia University Contributions
to Anthropology, Vol. VII, New
York.
Exceptionally useful reference but
difficult to find.
- Reinhart, Theodore R.
1967a The Rio Rancho Phase: A Prelimi-
nary Report on Early Basketmaker
Culture in the Middle Rio Grande
Valley, New Mexico. American
Antiquity 32(4): 458-470.
Discussion of early Basketmaker
(Basketmaker II sites) on the
west mesa of Albuquerque.
(General overview, pertaining to
Archaic, Albuquerque Area.)
- 1967b The Alameda Phase: An Early
Basketmaker III Culture in the
Middle Rio Grande Valley, New
Mexico. Southwestern Lore
33(1):24-32.
(Albuquerque, Cibola National
Forest.)
- 1968 Late Archaic Cultures of the
Middle Rio Grande Valley, New
Mexico: A Study of the Process
of Culture Change. (Unpublished
Ph.D. Dissertation, University of
New Mexico, Albuquerque).
Doctoral dissertation on the Rio
Rancho and Alameda Phase sites
west of Albuquerque.

- (Albuquerque, Cibola National Forest.)
- Reiter, Paul
1938 The Jemez Pueblo of Unshagi, New Mexico with notes on the Earlier Excavations at "Amoxiumqua" and Giusewa, University of New Mexico Bulletin 326, Monograph Series Vol 1, No. 5, Albuquerque.
Discussion of the excavations in the ancestral Jemez pueblos. Tree-ring data contributed by Stallings and notes on the ceramic technology by Anna Shepard.
- Renaud, E. B.
1942 Reconnaissance Work in the Upper Rio Grande Valley, Colorado and New Mexico, Department of Anthropology, University of Denver, Archaeological Series, Third Paper, Denver.
Discussion of Rio Grande Culture artifacts, that is, various lithic sites and artifacts.
- 1946 Archeology of the Upper Rio Grande Basin in Southern Colorado and Northern New Mexico, Department of Anthropology, University of Denver, Archaeological Series, Sixth Paper, Denver.
More on "Rio Grande Culture." (General overview PaleoIndian and Archaic.)
- Rippy, J. F.
1926 The United States and Mexico. New York: Knopf.
- Rittenhouse, Jack D.
1971 The Santa Fe Trail, A Historical Bibliography, Albuquerque: University of New Mexico Press.
- Roberts, Frank H. H. Jr.
1935 A Folsom Complex: Preliminary Report on Investigations at the Lindenmeier Site in Northern Colorado. Smithsonian Miscellaneous Collections 94(4). (PaleoIndian.)
- 1936a Additional Information on the Folsom Complex: Report on the Second Season's Investigations at the Lindenmeier Site in Northern Colorado. Smithsonian Miscellaneous Collections 95(10). (PaleoIndian.)
- 1936b A Survey of Southwestern Archaeology, Smithsonian Annual Report for 1935, pp. 507-533. Washington.
Report contains Robert's revised developmental scheme for the Anasazi.
- 1937 New Developments in the Problem of the Folsom Complex: Explorations and Field Work at the Smithsonian in 1936. Smithsonian Publications 3407:69-74. (PaleoIndian.)
- 1942 Archeological and Geological Investigations in the San Jon District, Eastern New Mexico. Smithsonian Miscellaneous Collections 103(4). (General overview, pertaining to PaleoIndian.)
- Robinson, William J., John W. Hannah and Bruce G. Harrill
1972 Tree-Ring Dates from New Mexico, I, O, U Central Rio Grande, Laboratory of Tree-Ring Research, Tucson: The University of Arizona.
Basic reference. Contains all available tree-ring dates as of 1972 from the Santa Fe District, Pajarito Plateau and Jemez areas.
- Robinson, William J., Bruce G. Harrill, and Richard L. Warren
1973 Tree-Ring Dates from New Mexico J-K, P, V Santa Fe, Pecos -Lincoln Area, Laboratory of Tree-Ring Research, Tucson: The University of Arizona.
Standard reference work containing available tree-ring dates as of 1973. Data relevant for the Santa Fe and Galisteo Basin areas.
- 1974 Tree-Ring Dates from New Mexico B, Chaco-Gobernador Area, Tucson: Laboratory of Tree-Ring Research, University of Arizona.
- Rogers, M. J. et al.
1966 Ancient Hunters of the Far West,

San Diego: Union - Tribune Publishing Co.
Discussion of San Dieguito materials; not found within the study area but relevant of the Archaic in general.

Rohn, Arthur H.

1963 Prehistoric Soil and Water Conservation on Chapin Mesa, Southwestern Colorado, American Antiquity 28(4):441-455.

1977 Cultural Change and Continuity on Chapin Mesa, Lawrence: The Regents Press University of Kansas.

Roosa, William B.

1956a Preliminary Report on the Lucy Site. El Palacio 63:36-49.
(General overview, pertaining to PaleoIndian.)

1956b The Lucy Site in Central New Mexico. American Antiquity 21(3):310.
(General overview, pertaining to PaleoIndian.)

1968 Data on Early Sites in Central New Mexico and Michigan. (Unpublished PhD Dissertation, University of Michigan, Ann Arbor).
(General overview, pertaining to PaleoIndian.).

Roye, Yvonne

1976 An Archeological Clearance Investigation for the Exxon Company, Rio Arriba County, New Mexico, Lab Notes 126A, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.
Report notes that on the West Chama portion of the project, two partial obsidian points of Late Archaic or Early Basketmaker affiliation were encountered within a lithic scatter.

Rule, Pam

1973 Site 54: A Lithic Workshop Near Valdez, New Mexico. (Ms. on file, USDA Forest Service, Southwestern Regional Office, Albuquerque.)
Intensive analysis of lithic materials collected from corporately held private land by Gary Hume

and two students between 8/2 and 8/4 1973. The site is on the first contour above the Hondo, on a basalt out-crop. This report is meant to serve as a comparison for later analysis of Valerie Hume's material. (Taos Area, Carson National Forest.)

Sahlins, Marshall

1972 Stone Age Economics. Chicago & New York: Aldine Atherton, Inc.
A general work in economic and political anthropology. Sahlins' views are provocative but many are not generally accepted.

Sanchez, George I.

1967 Forgotten People: a Study of New Mexicans Albuquerque: Calvin Horn, (reprint of 1940 University of New Mexico Press volume).

Saunders, Lyle A

1944 A Guide to Materials Bearing on Cultural Relations in New Mexico, Inter-American Bibliographies III, Albuquerque: University of New Mexico Press.
Annotated and indexed bibliography of 5335 entries.

Schaafsma, Curtis F.

1968 Archaeological Salvage Investigations along New Mexico Highway 44 Near Bernalillo, New Mexico. Laboratory of Anthropology Notes 5(49). Museum of New Mexico, Santa Fe.
Preliminary report of LA 326 (Puaray Cemetery) and LA 8991 (Loma Barron). Fifteen burials were excavated from LA 326. LA 8991 is considered an Archaic site. Report does not contain analytical results. (Albuquerque, Cibola National Forest.)

1975a Archaeological Survey and Excavations at Abiquiu Reservoir, Rio Arriba County, New Mexico. School of American Research, Santa Fe.
Continuing work as reported in Schaafsma 1976. (Chama Area, Santa Fe National Forest.)

1975b Archaeological Clearance Survey for Duval Corporation on Gallina Peak, Taos County, New Mexico.

(Ms. on file, School of American Research, Santa Fe, and USDA Forest Service, Southwestern Regional Office, Albuquerque.) Although no cultural materials were found, the report contains a good summary of Taos archeology up to 1975 and specific discussion of models for the Archaic. (Taos Area, Carson National Forest.)

- 1976 Archaeological Survey of Maximum Pool and Navajo Excavations at Abiquiu Reservoir Rio Arriba County, New Mexico. School of American Research, Santa Fe. Discussion of the Archaic material from the Abiquiu Reservoir District, and Schaafsma's "model" of archaic annual subsistence patterns (derived from the Owens Valley Paiute). (Chama Area, Carson National Forest.)

- 1977 A Road and Drill Pad Survey for the Questa Molybdenum Company, Carson National Forest. In Archeological Report No. 15:1-12. Miscellaneous Papers, USDA Forest Service Southwestern Regional Office, Albuquerque. One artifact, a flake tool (maybe Archaic) was found at an elevation of 10,080 feet on a south facing slope. It is fine grained basalt. (Taos Area, Carson National Forest.)

Schaafsma, Polly

- 1972 Rock Art in New Mexico. Santa Fe: New Mexico State Planning Office. This is a state wide survey of rock art sites, and although only a small fraction of these sites is covered, the goal was to obtain a representative sample of rock art sites. A regional approach is used. (General overview, pertaining to rock art.)

Schaafsma, Polly and Curtis F. Schaafsma

- 1974 Evidence for the Origins of the Pueblo Katchina Cult as Suggested by Southwestern Rock Art. American Antiquity 39(4) Pt. 1:535-545. Discussion of the possible origins of the Katchina cult via the

Jornada Mogollon. Data are rock art and kiva murals.

Schilling, John H.

- 1960 Mineral Resources of Taos County, New Mexico. Bulletin 71 State Bureau of Mines and Mineral Resources. Socorro: New Mexico Institute of Mining and Technology, Campus Station. In addition to the description of mineral deposits, the report contains discussion of the history of mining activity at Amizette, Twining, La Belle, Anchor, Midnight, Bitter Creek, Harding, and Questa Molybdenum. (Taos Area, Carson National Forest.)

Schoenwetter, James

- 1962 Pollen Analysis from Eighteen Archeological Sites in Arizona and New Mexico. Fieldiana: Anthropology 53:168-235. A synthesis of pollen data from some 17 archeological sites. Schoenwetter's major emphasis is on shifts in seasonality of rainfall, not on variability in amount. Pertains primarily to post-Basketmaker times. (General overview, pertaining to Paleo-climatology.)

- 1966 A Re-evaluation of the Navajo Reservoir Pollen Chronology. El Palacio 73(1):19-26. The revision reflects: I. new dating based on continued archeological analysis and II. correspondence of the Navajo Reservoir with other areas of the southwest from which there are paleo-ecological data. Data are drawn primarily from the Navajo Reservoir, Snowflake-Mesa Redondo area Arizona, the Chuska area, Southwestern Utah, Sapawe, Picuris, Cochiti and the Galisteo Basin. There are still acknowledged discrepancies and some data gaps. (General overview.)

Schoenwetter, James and Alfred E. Dittert, Jr.

- 1968 An Ecological Interpretation of Anasazi Settlement Patterns, pp. 41-66 in Anthropological Archeology in the Americas, Betty

- J. Meggers, ed., Washington, D.C.: The Anthropological Society of Washington.
- Scholes, France V.
1930 "The Supply Service of the New Mexico Missions in the 17th Century," New Mexico Historical Review #5.
General relevance to the historic mission period.
- 1937 Church and State in New Mexico, 1610-1650, New Mexico Historical Society Publications in History, Vol. 7.
General relevance to the historic mission period.
- 1942 Troublous Times in New Mexico, 1659-1670, Historical Society of New Mexico, Publications in History, Vol. XI, No. 2.
- Schorsch, Russell L.
1962 A Basket Maker III Pit House Near Albuquerque. El Palacio 69(2):114-118.
Report of the St. Joseph site, salvaged after having eroded from the unpaved State Highway 448 on the west mesa of Albuquerque. Excavation was completed in April 1956 (site revisited during the summer) by the University of New Mexico Anthropology Club. It is the first reported pit house with antechamber this far east in New Mexico. (Albuquerque, Cibola National Forest.)
- Schroeder, Albert H.
1953 Brief History of the Chama Basin, In Salvage Archaeology in the Chama Valley, New Mexico, Fred Wendorf, ed. Santa Fe: Mongoraphs of the School of American Research No. 17.
Brief discussion of documents relating to the first Spanish expeditions into the Chama, the founding of San Gabriel, the beginning of Ute trade and the Chama as a "natural trade and travel route."
- 1966 Tentative Ecological and Cultural Forces and Their Effects on Southwestern Indian Farmers. Pp. 17-20 in Contributions to Southwestern Prehistory, VII INQUA. Eastern New Mexico University, Cynthia Irwin-Williams, ed. Boulder and Denver.
This paper provides a good survey of historic references to past climate in the Southwest, in addition to a brief review of historic rebellions, revolts and raiding of various Indian groups. (General overview.)
- 1973a "The Mescalero Apaches," pp. 123-144 in Technical Manual, 1973 Survey of the Tularosa Basin, Human Systems Research, Inc., New Mexico.
Schroeder provides Spanish chronicle and other early historic references to the Apache groups of eastern New Mexico.
- 1973b The Changing Ways of Southwestern Indians. Glorieta, N.M.: Rio Grande Press.
- Schroeder, Albert H. and Dan S. Matson, eds.
1965 A Colony on the Move: Gaspar Castano de Sosa's Journal, Santa Fe: School of American Research. Accounts relevant to the Galisteo Pueblos, eastern Apache groups, etc.
- Schultz, C. B. and Larry D. Martin
1970 Quaternary Mammalian Sequence in the Central Great Plains, pp. 341-354 in W. Dort, Jr. and J. K. Jones, eds. Pleistocene and Recent Environments of the Central Great Plains, Lawrence: The University Press of Kansas. (General overview, pertaining to PaleoIndian.)
- Schwartz, D. W. and R. W. Lang
1972 Archaeological Investigations at the Arroyo Hondo Site Third Field Report 1972, School of American Research, Santa Fe.
In addition to containing a chronology of the building phases at Arroyo Hondo, this report integrates the survey results obtained by Dickson.
- Seaman, Timothy J.
1976 Archeological Investigations on the San Juan-to-Ojo 345KV

Transmission Line for Public Service Company of New Mexico. Excavation of LAl1843: An Early Stockaded Settlement of the Gallina Phase. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe, and USDA Forest Service, Southwestern Regional Office, Albuquerque.)

The research design (developed by David Snow) focused on functional interpretation of Gallina architectural and material variability and the relationship of variability to site emplacement. This report is an excellent example of the kind of work that can be done. The site consists of a large pit house, 2 surface structures, 16 hearths and a stockade. It dates to shortly after A.D. 1100 (tree-ring dates). The report contains an excellent history of Gallina area archeology and recommendations for future research. Importantly, Seaman sees Gallina as a local development out of Rosa with variability largely due to function (that is dependence on more or less agriculture, hunting etc.) perhaps conditioned by climatic change. (Gallina area, Santa Fe National Forest.)

Sellards, E. H.

1940 Early Man in America: Index to Localities, and Selected Bibliography. Bulletin Geological Society of America 51:373-432. (General overview).

1952 Early Man in America: a Study in Prehistory, Austin: University of Texas Press. (General overview, PaleoIndian.)

Service, Elman R.

1971 Primitive Social Organization, An Evolutionary Perspective, Second Edition, New York: Random House.

Shelton, Wilma L.

1954 Checklist of New Mexico Publications, 1850-1953, Albuquerque: University of New Mexico Press.

Shepard, Anna O.

1942 Rio Grande Glaze Paint Ware: Contributions to American Anthropology and History, No. 39, Carnegie Institute of Washington, publication 528, Washington.

Classic reference to the study of trade via petrographic analysis of glaze ceramics.

Sherman, James E. and Barbara H.

Sherman

1975 Ghost Towns and Mining Camps of New Mexico. Norman: University of Oklahoma Press. Data used to prepare map of ghost towns and mining camps.

Shoemaker, John W. and William L. Hiss

1974 Humate Mining in Northwestern New Mexico: pp. 333-336 in New Mexico Geological Society Guidebook, 25th Field Conference, Ghost Ranch. Charles T. Siemers, ed.

Commercial production of humates, as a soil conditioner, is carried out mostly in the San Juan Basin in New Mexico; however, in the Jemez area, there are strip mining operations near La Ventana, San Ysidro and Cuba. (Chama Area and Pajarito Plateau, Santa Fe National Forest.)

Siegel, Bernard J.

1959 "Some Structural Implications for Change in Pueblo and Spanish New Mexico," pp. 37-44. In Intermediate Societies, Social Mobility and Communication: Proceedings of the 1959 Annual Spring Meeting of the American Ethnological Society, V.F. Ray, editor Seattle: University of Washington Press.

Simmons, Marc

1968 Spanish Government in New Mexico, Albuquerque: University of New Mexico Press. Good historical reference.

1969 Settlement Patterns and Village Plans in Colonial New Mexico, Journal of the West 8:7-21. Simmons contrasts the hacienda pattern of the 17th century with

the small land holdings and dispersed communities of the 18th century.

Skinner, S. Alan

1965a Lizard Cave: A Rock Shelter in Northeastern New Mexico. El Palacio 72(1):5-24.

The site is a small rock shelter in north Ponil Canyon first explored by Eugen Lutes and John Harrison in 1956. Skinner's work was done between July 16 and 28th of 1962. The rock shelter apparently contained two components: a Puebloan occupation and a Jicarilla occupation or use. All excavated material is well described. (Taos Area, Carson National Forest.)

1965b The Sedillo Site: A Pit House Village in Albuquerque. El Palacio 72(1):5-24.

Report of the excavation of LA3122, on private land on the first terrace of the Rio Grande west of the river. The work was done between February 1963 and November 1963 by the University of New Mexico Anthropology Club. Ten pithouses, bell-shaped storage pits, etc. described. On the basis of ceramics Skinner dates the site to Pueblo II. (Albuquerque, Cibola National Forest.)

1965b A Survey of Field Houses at Sapawe, North Central New Mexico, Southwestern Lore 31(1):18-24.

Skinner's survey was conducted within one square mile of Sapawe. He recorded 20 small structures which he suggests are field houses associated with the large Biscuit ruin.

Smith, Anne M.

1966 New Mexico Indians: Economic, Educational and Social Problems, Museum of New Mexico Research Records, No. 1, Santa Fe.

Smith, Carol A.

1976 Regional Economic Systems: Linking Geographical Models and Socioeconomic Problems, pp. 3-63

in Carol A. Smith, editor, Regional Analysis: Volume I Economic Systems, New York: Academic Press.

Smith, Landon D. and Herbert W. Dick

1977 A Preliminary Analysis of Three Sample Surveys in the Golondrino Mesa Area, Santa Fe National Forest, New Mexico. Archeological Report No. 15, USDA Forest Service Miscellaneous Papers Nos. 1-12. Southwestern Region, Albuquerque, New Mexico. Site densities for the Golondrino - Gallina area are 20/square mile, Poso area 10/square mile. Types of sites are stone surface structures, adobe structures and pithouses. The paper contains a table of "Significant Dependent Relationships by Time Period for All Research Areas." The variables examined are drawn from the SARG design ie. site type vs. regional land form, arable land, vegetation etc. The highest level of significance is between Site Type/Regional Land Form, Site Type/Arable Land from 1200-1300 A.D., and Site Type/Arable Land for 1100-1199 A.D. It also appears that relationships become more significant through time. (Gallina Area, Santa Fe National Forest.)

Snow, David H.

1972 Archeological Survey, New Mexico State Highway Project Tijeras Canyon I-040-3(18) 169. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.) (Albuquerque, Cibola National Forest.)

1973a Cochiti Dam Salvage Project: Archeological Investigations at LA 8720 Cochiti Dam, New Mexico 1971. Museum of New Mexico, Santa Fe. Brief discussion of a multicomponent site, one component of which is Archaic. (Cochiti, Santa Fe National Forest.)

1973b Cochiti Dam Salvage Project: Archeological Excavation at the Torreon Site LA 6178, Cochiti Dam, New Mexico, Museum of New

- Mexico, Laboratory of
Anthropology Notes, No. 76,
Santa Fe.
- The Torreon site is multi-component with an 18th century site superimposed above a possible jacal structure of unknown temporal position but possibly used during the Pueblo Revolt. Later use of the site during the 19th and 20th century occurred as well.
- 1973c Cochiti Dam Salvage Project: Archeological Excavation of the Las Majadas Site LA 591, Cochiti Dam, New Mexico, Laboratory of Anthropology Notes No. 75, Santa Fe.
- Site contained a prehistoric component and a 16th century colonial settlement and a later historic component.
- 1974 The Excavation of Saltbush Pueblo, Bandelier National Monument, New Mexico, 1971, Laboratory of Anthropology Notes No. 97, Santa Fe.
- Report of the excavation of a small Coalition Period site in Frijoles Canyon, notable for its "keyhole" shaped kiva.
- 1975 Archaeological Survey and Assessment Espanola-Rio Chama Watershed Santa Fe and Rio Arriba Counties, New Mexico conducted for the U.S. Soil Conservation Service, Museum of New Mexico, Laboratory of Anthropology Notes, No. 115, Santa Fe.
- Seven archeological sites were located during survey and described. These include 2 lithic scatters, an historic windbrake, a Pueblo shrine, and a small masonry room.
- 1976 Cultural Resources Investigation and Recommended Program for Alleviation of Direct and Indirect Impact on Archeological Sites in Cibola National Forest, New Mexico. New Mexico State Highway Department Project I-040-3(55) 171, Tijeras Canyon, New Mexico. (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe, and USDA Forest Service, Southwest Region, Albuquerque.) (Albuquerque, Cibola National Forest).
- South, Stanley
- 1977 Method and Theory in Historical Archeology, New York: Academic Press.
- Good introduction to South's work and current directions in historical archeology.
- 1978 Pattern Recognition in Historical Archaeology, American Antiquity 43(2):223-230.
- An overview article of recent studies in historical archaeology and results of South's research.
- South, Stanley, editor
- 1977 Research Strategies in Historical Archeology, New York: Academic Press.
- Papers reflect the current interests of historic archeology as a field.
- Speth, John D.
- 1973 Arroyo Las Lagunitas Nonceramic Site: Preliminary Survey Report (Ms. on file Laboratory of Anthropology, Museum of New Mexico, Santa Fe.)
- Preliminary report on LA-10998, a lithic site on the east bank of the El Rito River, based on surface observations. Some flakes show thermal crazing. No "diagnostic" point types were observed.
- Spicer, Edward H.
- 1962 Cycles of Conquest, Tucson: University of Arizona Press.
- Treatment of acculturation of northern Mexican and Southwestern Indian societies in terms of changing Spanish administrative policies and later Mexican and U.S. policies.
- Spooner, Brian, editor
- 1972 Population Growth: Anthropological Implications, Cambridge: MIT Press.
- Collection of essays inspired by Boserup's model.
- Spuhler, J. H.
- n.d. Genetic Distances, Trees, and

- Maps of North American Indians. (Ms. prepared for Vol. I, Handbook of North American Indians). Chapter presents analysis in the variation in blood group gene frequencies between samples of 50 North American Indian populations and comparisons to linguistic and culture area affiliations. Of note are the groups in the Southwest; Hopi-Tewa, Jemez, Isleta, Laguna, Zuni, Western and Eastern Navajo, Mescalero and Chiricahua Apache. (General overview, pertaining to genetics.)
- Steen, Charles R.
1955 The Pigeon Cliffs Site. A preliminary report, El Palacio 62:174-180.
- 1977 Pajarito Plateau Archaeological Survey and Excavation. Los Alamos Scientific Laboratories, Los Alamos.
This report provides a useful summary of the kinds of sites found on the Pajarito Plateau. Basically, the Archaic is represented by points as isolated artifacts and not sites. Steen believes the Plateau was utilized but not inhabited until late in the 13th century. There is an abundance of small sites, then an apparant population aggregation at the large, well-known sites (ie. Otowi, Tshirigi, Tsankawi), and final abandonment. Sites which are large, are listed which have been nominated for the National Register. (Pajarito Plateau, Santa Fe National Forest.)
- Stein, John R.
1976 An Archeological Survey of the Tetilla Peak Recreation Area. (Ms. on file, Office of Contract Archeology, University of New Mexico, Albuquerque). Most remains discussed are Pueblo IV; however, some discussion of a possible Archaic lithic site is given. Report contains a good discussion of agricultural features and apparent field houses in the White Rock Canyon area. (Cochiti, Santa Fe National Forest.)
- Stevens, Dominique E. and George A. Agogino
1975 Sandia Cave: A Study in Controversy. Eastern New Mexico University Contributions in Anthropology 7(1). Eastern New Mexico University, PaleoIndian Institute, Portales. (Albuquerque, Cibola National Forest.)
- Stevenson, Matilda Coxé
1915 Ethnobotany of the Zuni Indians. Pp. 31-102 in Thirtieth Annual Report of the Bureau of American Ethnology, 1908-1909. Washington, D.C.
(General overview, pertaining to ethnobotany.)
- Steward, Julian H.
1955 Theory of Culture Change, Urbana: University of Illinois Press.
- Stewart, Omer C.
1971 Ethnohistorical Bibliography of the Ute Indians of Colorado, University of Colorado Studies Series in Anthropology, No. 18, Boulder.
Valuable reference for Ute Indians in New Mexico as well as Colorado.
- 1977 Ethnography of the Eastern Ute (Ms., University of Colorado, Boulder) Valuable information with respect to Ute-Apache interaction, Ute material culture and settlement.
- Stice, Randy and Michael Wendorf
1973 TA 600. (Ms. on file, USDA Forest Service, Southwestern Region Albuquerque, and at Fort Burgwin Research Center, Ranchos de Taos, New Mexico.)
The site is St. Vrain's Mill, a mid 19th century structure. Built in 1848 and burned in 1864. It apparently was reused in 1892. The buildings were finally abandoned ca. 1903. It is a good descriptive report. (Taos Area, Carson National Forest.)
- Stuart, David
1978 Topographic Variability and Site Placement: Developing a Strategy for Maximizing Small Project Survey Data. Paper presented at

the Society for American Archaeology annual meeting in Tucson.

Stubbs, S. A. and W. S. Stallings, Jr.

- 1953 The Excavation of Pindi Pueblo, New Mexico, Monographs of the School of American Research, No. 18, Santa Fe.
Pindi Pueblo, in the village of Agua Fria, below Santa Fe dates to the A. D. 1300's. Like Forked Lightning Pueblo (near Pecos) it is a fairly large Coalition site. The report is a standard, classic reference for the period.

Swadesh, Francis Leon

- 1973 20,000 Years of History: A New Mexico Bibliography, Santa Fe: Sunstone Press.
Annotated and indexed bibliography with 813 entries.
- 1974 Los Primeros Pobladores: Hispanic Americans of the Ute Frontier, Notre Dame and London: University of Notre Dame Press.
An excellent anthropological approach to the history of Hispanic settlement in the San Juan Basin primarily, although material on the Chama is abundant as well. Contemporary settlement, social and political characteristics of rural Hispanic communities provided.

- 1976 Archeology, Ethnohistory and the First Plaza of Carnuel, Ethnohistory 23(1):31-44.
In addition to providing full documentation for the location and settlement of Carnuel (Tijeras Canyon), the paper provides a good discussion of the benefits of interaction between archival research and archeology.

Swadesh, Frances Leon, J. W. Vigil and M. B. Ochoa

- 1976 The Lands of New Mexico, Bilingual Teacher Training Unit, Research, Planning and Innovation Division, Santa Fe.

Swank, George R.

- 1932 The Ethnobotany of the Acoma and Laguna. (Unpublished Master's Thesis, Department of

Biology, University of New Mexico, Albuquerque).

(General overview, pertaining to ethnobotany.)

Terrel, James and Sally Kleiner

- 1977 Archeological Salvage at ENM 10636 Carson National Forest, New Mexico, pp 1-17, in Miscellaneous Papers, Nos. 1-12, Archeological Report No. 15, USDA Forest Service, Southwestern Regional Office, Albuquerque.
Report of a burial exposed by a road grader on the route to El Paso Natural Gas Well 28-4#6 (Jicarilla District) Carson. The burial is probably Rosa phase (ceramics) although there was considerable ceramic variability and one late Zia sherd. The burial is probably associated with archeological site AR-03-02-03-78. (Taos Area, Carson National Forest.)

Terrell, John

- 1972 Apache Chronicle, New York: T. Y. Crowell Co.

Thomas, Alfred Barnaby

- 1935 After Coronado, Spanish Exploration Northeast of New Mexico 1869-1927. Norman: University of Oklahoma Press.

Thoms, Alston

- 1976 Review of Northeastern New Mexico Archeology. AWANYU 4(1):8-35.
The area discussed includes the western plains margins and the Sangre de Cristos. The literature is reviewed by culture and time period. (Taos Area, Carson and Santa Fe National Forests.)

Thornbury, William D.

- 1965 Regional Geomorphology of the United States, New York: John Wiley & Sons.
A standard text book that has some detailed information.

Tierney Gail D. with the assistance of Lisa A. Jones

- 1977 A Vegetative Survey of White Rock Canyon: 5280-5400 Foot (1610-1646 Meter) Elevations pp. 39-67 in Jan V. Biella and Richard

- C. Chapman, eds. Archeological Investigations in Cochiti Reservoir, New Mexico Volume I: A Survey of Regional Variability, Albuquerque: University of New Mexico Department of Anthropology, Office of Contract Archeology.
Detailed vegetative survey in connection with the Cochiti Project.
- Tichy, Marjorie F.
1939 The Archaeology of Puaray. El Palacio 46(7):145-162.
The only available report on the 1934 excavations at Bandelier's Puaray. Brief description of 400 rooms, kiva and possible mission. Important mention of 2 pithouses southeast of the village which would seem to date ca. 1275-1300 on the basis of ceramics. (Albuquerque.)
- Titiev, Mischa
1944 Old Oraibi: a Study of the Hopi Indians of Third Mesa, Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University Vol. 22, No. 1, Cambridge.
- Trager, George L.
1967 "The Tanoan Settlement of the Rio Grande Area: a Possible Chronology," In Dell Hymes and W. E. Bittle, editors, Studies in Southwestern Linguistics, The Hague: Mouton.
Based on linguistic analysis.
- Trainer, Frank W.
1974 Ground water in the Southwestern Part of the Jemez Mountains Volcanic Region. Pp. 337-345 in New Mexico Geological Society Guidebook, 25th Field Conference Ghost Ranch, Charles T. Siemers, ed.
This paper provides a good discussion of the differential permeability of rocks in the southwestern Jemez mountains, the major conditioning agents of surface water and the probable agents responsible for the thermal springs. A map is included. (Pajarito Plateau, Santa Fe National Forest.)
- Traylor, Diane et al.
1977 Bandelier: Excavations in the Flood Pool of Cochiti Lake, New Mexico (Ms. on file Southwest Cultural Resource Center, National Park Service, Santa Fe.)
Report of survey and excavation, including detailed analysis of material culture, carried out by NPS in the Alamo section of Bandelier National Monument. (Pajarito Plateau District.)
- Trimmer, Maurice
1974 The Story of New Mexico, Fenton, Michigan: American Geographic.
- Tringham, Ruth, editor
1979 Lithic Analysis in Archeology, New York: Academic Press.

Provides general productive directions for research in lithic analysis. Of note are Tringham's own work which combines Semenov's approach with experimentation and Gould's paper on ethnoarcheological approaches.
- Tuan, Yi-Fu, Cyril E. Everard, Jerold G. Widdison, and Iven Bennett
1973 The Climate of New Mexico. Santa Fe: New Mexico State Planning Office.
This is a good and detailed climatic summary of New Mexico broken into sub-regions. There is also a comprehensive study of variability in temperature and rainfall where available. Climatic records were reported to 1850. Accompanying graphics and maps are excellent.
(General overview, pertaining to climatology.)
- Turner, Christy G. II
1977 Field Report presented at the 50th Pecos Conference, Pecos, New Mexico.
Suggests that molar morphology of the Trinidad Lake, Colorado skeletons indicates Athabascan affinities. The skeletal series dates to the 12th century.
- Tirney, John Francis
1943 Analysis of material taken from a Section of Group M of the Cliffs, Frijoles Canyon, Bandelier National

Monument, New Mexico (Unpublished M.A. thesis, Department of Anthropology, University of New Mexico, Albuquerque.)

The Group M sites consist of cavate, Pueblo IV sites in Frijoles Canyon. There are tree-ring dates from some of the sites and this report provides what little description of the excavated material is available. (Pajarito Plateau and the Santa Fe National Forest.)

Twitchell, Ralph Emerson

- 1911 Leading Facts of New Mexican History. Cedar Rapids, Iowa: The Torch Press, Five Vols. Standard historical reference. Volume I covers the period to 1822. Volume II deals with the Mexican and United States periods. (General overview, pertaining to Historic.)

Ungnade, Herbert E.

- 1963 Archaeological Finds in the Sangre de Cristo Mountains of New Mexico. El Palacio 70(4): 15-25.
Report of lithics picked up on various trips between 1948 and 1955 within what is now the Pecos Wilderness and adjacent areas of the Santa Fe Forest. Report supplements Wendorf and Miller. (Taos Area, Carson and Santa Fe National Forests.)

Ucko, Peter. R. Tringham and G. W.

Dimbleby, editors

- 1972 Man, Settlement and Urbanism, London: Gerald Duckworth and Co., LTD.

United States Department of Agriculture

- 1930 Climatic Summary of the United States: Northwestern New Mexico. Climatological summary in monthly averages for northwestern New Mexico from establishment of stations to 1930. (General overview, pertaining to climatology.)

United States Department of Commerce

- 1946 Annual Meteorological Summary with Comparative Data, Albuquerque, New Mexico.

Climatological data for Albuquerque, New Mexico 1893-1946.

(General overview, pertaining to climatology.)

- 1952 Climatic Summary of the United States - Supplement for 1931 through 1952: New Mexico. All recorded climatological data for New Mexico in monthly averages from 1931-1952. (General overview, pertaining to climatology.)

- 1970 Local Climatological Data Annual Summary with Comparative Data: Albuquerque, New Mexico. NOAA Environmental Data Service. Climatological Summary for Albuquerque, New Mexico. Monthly averages for precipitation, temperature, frost and solar radiation from 1931-1970. (General overview, pertaining to climatology.)

- 1973 Local Climatological Data Annual Summary with Comparative Data: Albuquerque, New Mexico. NOAA Environmental Data Service. Climatological summary for Albuquerque, New Mexico. Monthly averages for precipitation, temperature, frost and solar radiation from 1934-1973. (General overview, pertaining to climatology.)

- 1976a Climate of Bernalillo, New Mexico. Climatology of the U.S. No. 20. Climatological summary of Bernalillo, New Mexico in monthly averages from 1951-1974. (General overview, pertaining to climatology.)

- 1976b Climate of Los Alamos, New Mexico. Climatology of the U.S. No. 20. Climatological summary of Los Alamos New Mexico 1951-1974 in monthly averages. (General overview, pertaining to climatology.)

- 1976c Climate of Santa Fe, New Mexico. Climatology of the United States No. 20. Climatological summary in monthly

- averages of Santa Fe, New Mexico, 1951-1971.
(General overview, pertaining to climatology.)
- Vestal, Paul A.
1952 Ethnobotany of the Ramah Navaho. Papers of the Peabody Museum of American Archaeology and Ethnology XL (4). Reports of the Ramah Project No. 4., Harvard University, Cambridge.
(General overview, pertaining to ethnobotany.)
- Vickery, Lucretia D.
1969 Excavations at TA-26 A Small Pueblo Site Near Taos, New Mexico. (Unpublished M.A., Wichita State University).
TA-26 is important because it is Late Valdez Phase, showing some elements transitional to the Pot Creek Phase. The report contains some paleo-environmental data and faunal information. (Taos Area, Carson National Forest.)
- Vivian, Gordon
1934 The Excavation of Bandelier's Puaray, El Palacio, 37(19-20): 153-159.

So little has been published on this site, every note is important. (Albuquerque District.)

1959 The Hubbard Site and other Tri-wall Structures in New Mexico and Colorado, National Park Service Archeological Research Series, No. 5, Washington.
- Vivian, Gordon and Tom W. Mathews
1965 Kin Kletso, a Pueblo III Community in Chaco Canyon, New Mexico, Southwestern Monuments Association, Technical Series 6, Globe.
- Vivian, Gordon and Paul Reiter
1965 The Great Kivas of Chaco Canyon and Their Relationships, The School of American Research, Monograph No. 22, Santa Fe. Vivian and Reiter take the "narrow" view of Great Kivas, that is emphasizing the special architectural features associated with Chacoan Great Kivas rather than size.
- Vivian, R. Gwinn
1970 An Inquiry into Prehistoric Social Organization in Chaco Canyon, pp. 59-83 in William A. Longacre, ed., Reconstructing Prehistoric Pueblo Societies (School of American Research Book), Albuquerque: University of New Mexico Press.
Discussion of the differences between Hosta Butte and Bonito sites and the water control system at Chaco.

1974 Conservation and Diversion: Water-Control Systems in the Anasazi Southwest, pp. 95-112 in Theodore E. Downing and McGuire Gibson, eds., Irrigation's Impact on Society, Anthropological Papers of the University of Arizona, No. 25, Tucson.
Excellent discussion of the classes of water control systems found in the Anasazi area and the implications of these for the degree of organization needed to maintain them, as well as a detailed discussion of the water control features at Chaco Canyon.
- Vivian, R. Gwinn and Nancy Wilkinson Clendenen
1965 The Denison Site: Four Pit Houses near Isleta, New Mexico. El Palacio 72(2):5-26.
Site is eight miles southwest of Albuquerque. In addition to discussing the pithouse excavations, Vivian and Clendenen provide suggested "diagnostic" criteria for pithouse chronology. (Albuquerque.)
- Von Eschen, G. F.
1960a Climate of Chama, New Mexico. U.S. Department of Commerce, Weather Bureau.
Climatological summary of Chama New Mexico in monthly averages from 1925-1960.
(General overview, pertaining to climatology.)

1960b Climate of Espanola, New Mexico. U.S. Department of Commerce, Weather Bureau.
Climatological summary of Espanola, New Mexico, 1913-1960 in monthly averages.

(General overview, pertaining to climatology.)

- 1960c Climate of Taos, New Mexico. U.S. Department of Commerce, Weather Bureau. Climatological Summary of Taos, New Mexico from 1931-1960 in monthly averages.
(General overview, pertaining to climatology.)

- Vytlacil, Natalie and J. J. Brody
1958 Two Pit Houses Near Zia Pueblo. El Palacio 65(5):174-184.
Reports work of the 1956 University of New Mexico Field Session. Sites are on the Zia Reservation. Pit House I is Late Basketmaker-Pueblo I, Pit House 2 is Pueblo II. (Albuquerque.)

- Waddell, Eric
1975 How the Enga Cope with Frost: Responses to Climatic Perturbations in the Central Highlands of New Guinea. Human Ecology 3(4): 249-274.

- Walsh, Michael R., Janet D. Orcutt and James N. Hill
1978 Preliminary Report on the 1977-78 Pajarito Archaeological Research Project: An Archaeological Survey in the Santa Fe National Forest (Ms. on file, USDA Forest Service, Southeast Regional Office, Albuquerque).
Report contains Hill's research design and a discussion of his sampling procedure. Site data are not included. (Pajarito Plateau and the Santa Fe National Forest.)

- Ward, A. E., E. K. Abbink and J. R. Stein
1977 Ethnohistorical and Chronological Basis of the Navajo Material Culture, pp. 217-278 in Charles A. Reher, editor, Settlement and Subsistence Along the Lower Chaco River: The CGP Survey, Albuquerque: The University of New Mexico Press.
An excellent example of the way in which historic materials may be used to examine questions of general anthropological importance. Chapter also contains key artifacts

for determining the dates of historic sites.

- Warren, A. H.
1969 The Nambe Project Archaeological Salvage at Nambe Pueblo, Santa Fe County, New Mexico, Notes on Ceramics and Lithics of the Nambe Pueblo, Laboratory of Anthropology Notes 100, Santa Fe.
Discussion of geological source material for lithics and temper.
- 1970 Centers of Manufacture and Trade of Rio Grande Glazes (Ms. on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe).
Report provides dates for the various glaze types and suggested manufacturing and trade centers based on petrographic analysis of sherds.
- 1975 The Ancient Mineral Industries of Cerro Pedernal, Rio Arriba County, New Mexico. Pp. 87-93 in New Mexico Geological Society Guidebook, 25th Field Conference, Ghost Ranch, Charles T. Siemers, ed.
Report contains a good brief history of exploration of the quarries of the area. Specific discussion of sites includes Tsiping Pueblo and camp sites along the Cancito Seco. The specific quarry localities of Cerro Pedernal are discussed. (Chama Area, Carson National Forest.)
- 1977a Geology and Mineral Resources: White Rock Canyon, Sandoval County, New Mexico, pp. 15-30 In Archeological Investigations in Cochiti Reservoir, New Mexico Volume 1: A Survey of Regional Variability, Jan V. Biella and Richard C. Chapman, eds. University of New Mexico, Department of Anthropology, Office of Contract Archeology, Albuquerque.
In addition to general descriptive geology, the paper discusses geologic and mineral resources in terms of building material, temper, clays, pigments, sources of stone tools.
- 1977b Prehistoric and Historic Ceramic

- Analysis, pp. 97-101 In Archeological Investigations in Cochiti Reservoir, New Mexico, Volume 2 Excavation and Analysis 1975 Season, Richard C. Chapman and Jan V. Biella, eds. University of New Mexico, Department of Anthropology, Office of Contract Archeology, Albuquerque. Report provides type descriptions for prehistoric and historic mineral and carbon painted wares and Rio Grande Glazes found in the Cochiti area. Type characteristics include identified temper classes.
- 1977c Appendix I. New Dimensions in the Study of Prehistoric Pottery, pp. 363-374 In Archeological Investigations in Cochiti Reservoir, New Mexico, Volume 2: Excavation and Analysis 1975 Season, Richard C. Chapman and Jan V. Biella, eds., University of New Mexico, Department of Anthropology, Office of Contract Archeology, Albuquerque. Paper discusses temper analysis and its implications for the location of production and trade centers for the Rio Grande Glazes. Temper as an aid to microseriation is also discussed, as well as its utility for monitoring population movements. Refinements of Shepard's original work are discussed.
- Weber, David, editor
1973 Foreigners in their Native Land: Historical Roots of the Mexican Americans, Albuquerque: University of New Mexico Press.
- Weber, Robert H. and G. A. Agogino
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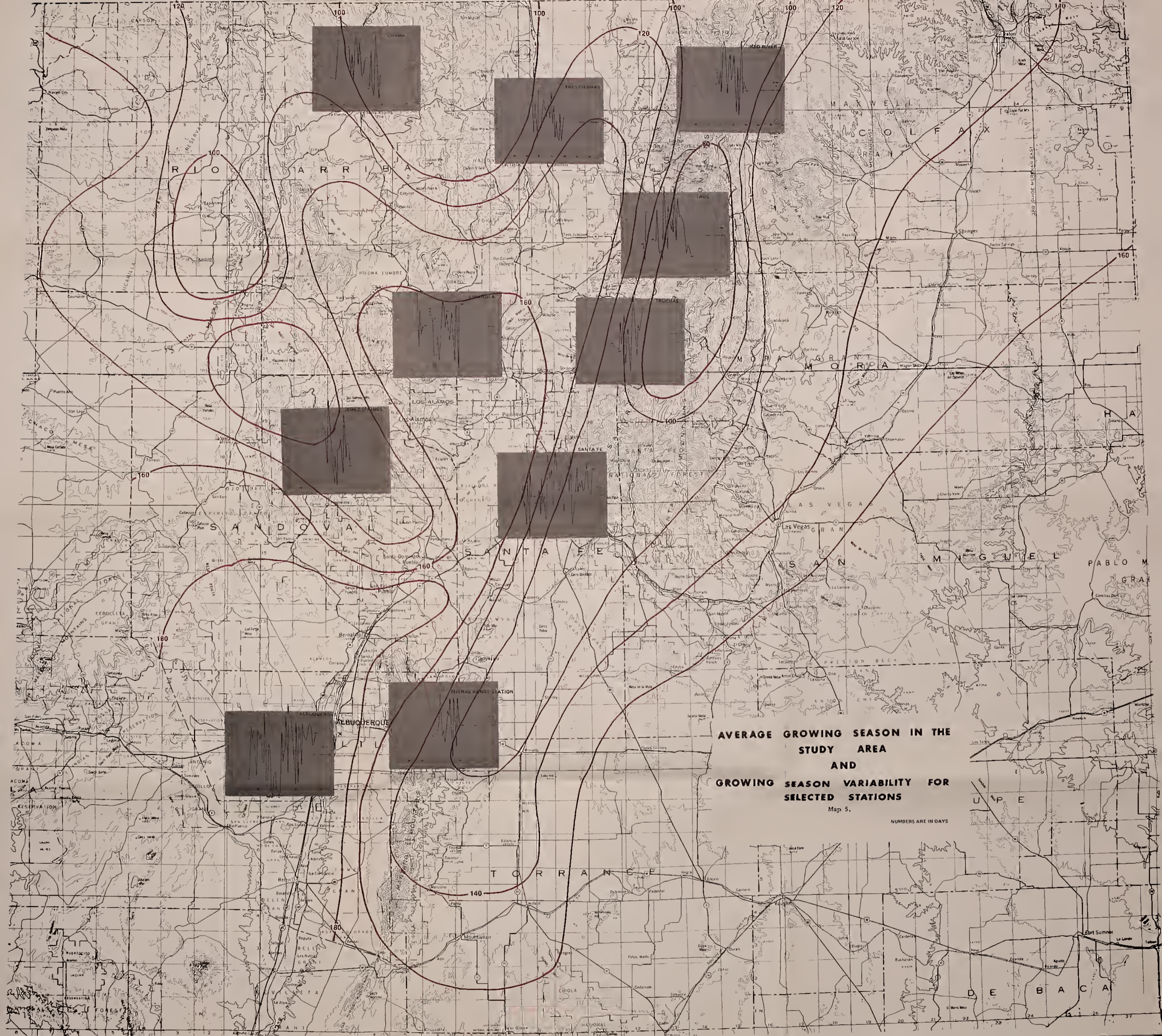
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**AVERAGE RAINFALL IN THE
STUDY AREA
AND
RAINFALL VARIABILITY FOR
SELECTED STATIONS**

Map 6.

NUMBERS ARE IN INCHES

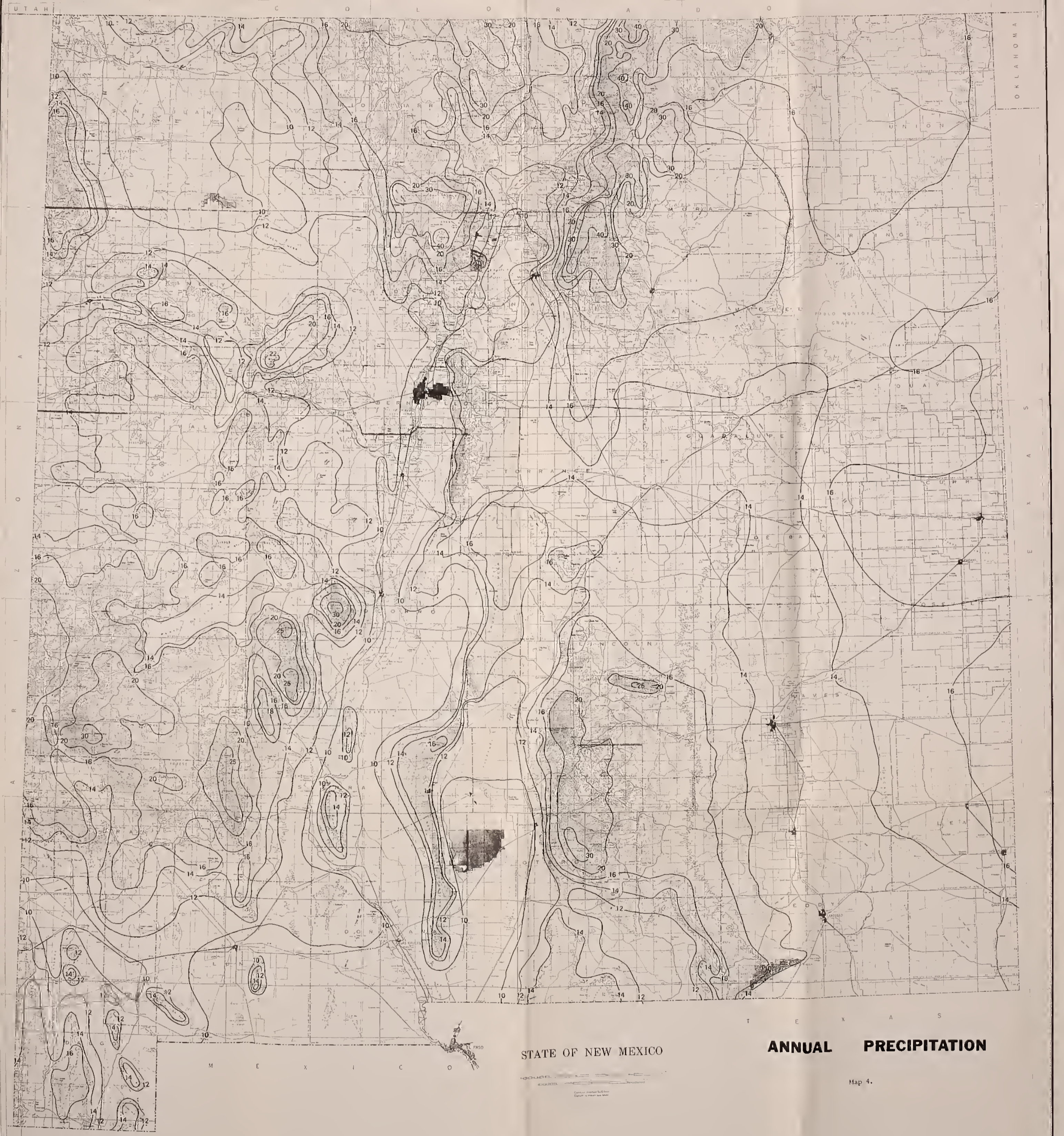


**AVERAGE GROWING SEASON IN THE
STUDY AREA
AND
GROWING SEASON VARIABILITY FOR
SELECTED STATIONS**

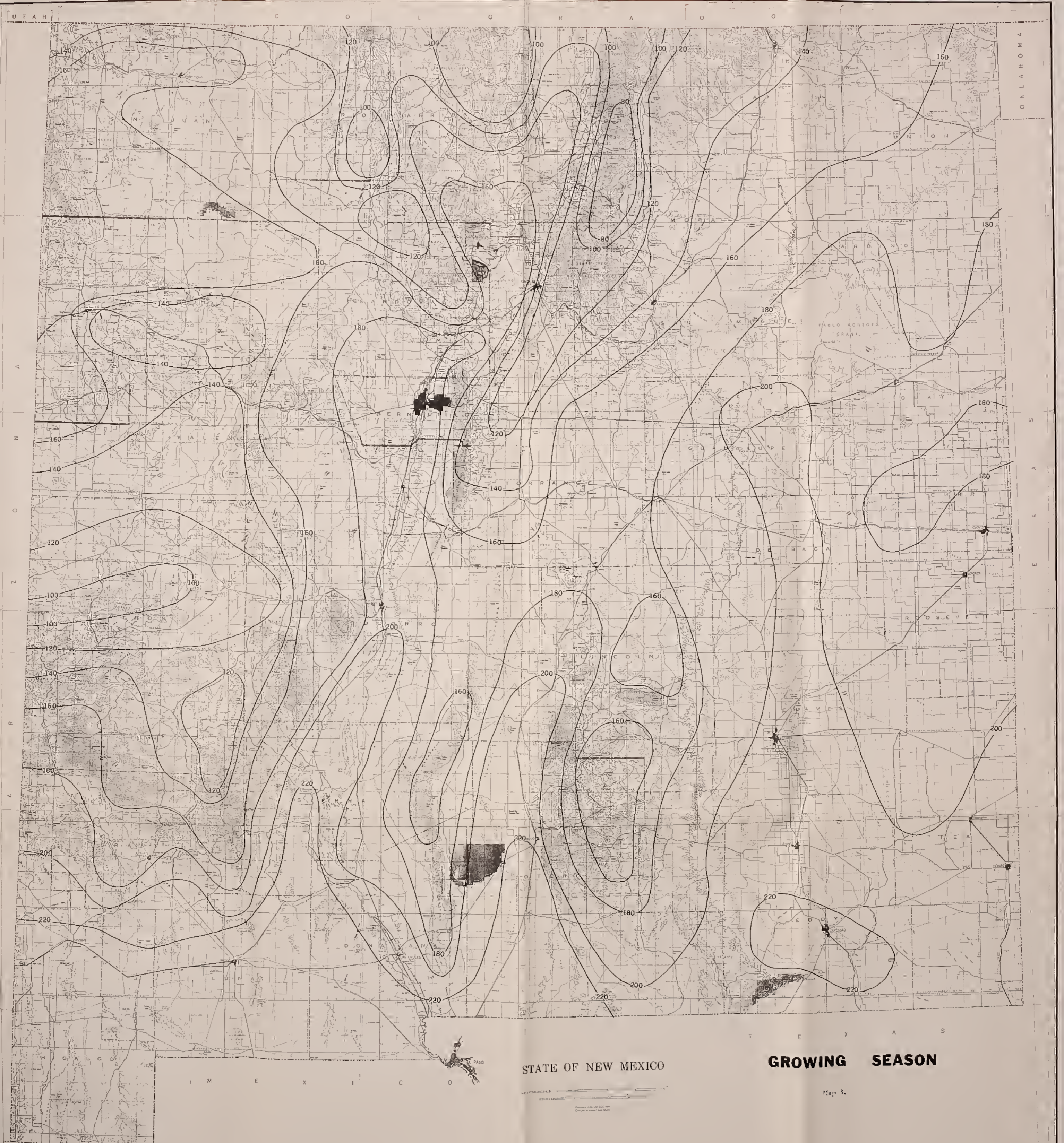
Map 5.

NUMBERS ARE IN DAYS







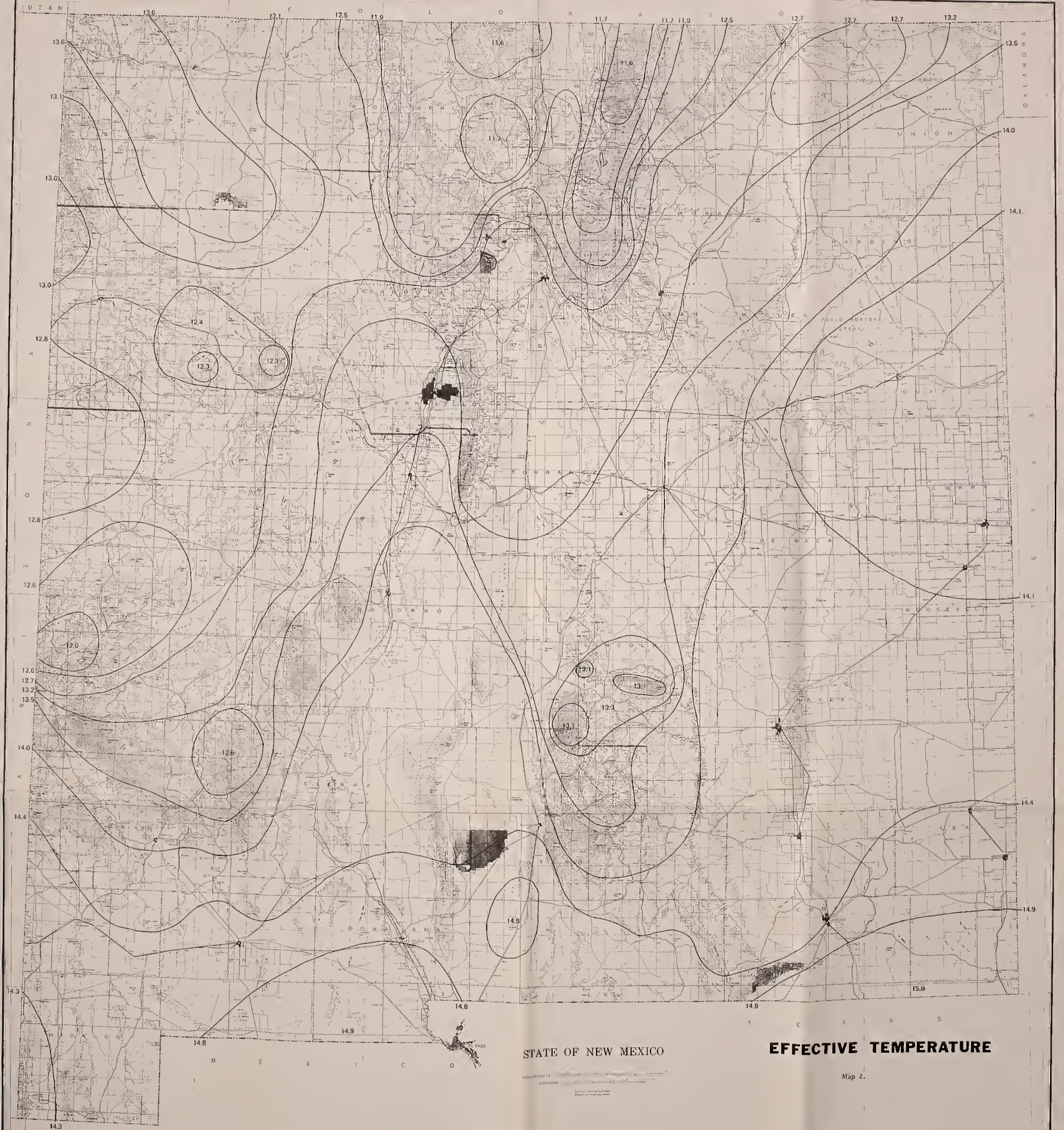


STATE OF NEW MEXICO

GROWING SEASON

Map 3.

NUMBERS ARE IN DAYS



STATE OF NEW MEXICO

EFFECTIVE TEMPERATURE

Map 2.

NUMBERS ARE IN DEGREES F°



